The role of incentives in initiation and maintenance of human behaviour on the example of exercising

Thesis

presented to the Faculty of Arts

of

the University of Zurich

for the degree of Doctor of Philosophy

by

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of Eischoll / VS

Accepted in the autumn semester 2007 on the recommendation of

Prof. Dr. Veronika Brandstätter and Prof. Dr. Ulrike Ehlert

2007

Summary

The present thesis bases on a core-construct of motivation psychology, namely incentives and their role on exercising as a repeatedly executed behaviour. The thesis focuses on two types of incentives. *Activity-related incentives* describe incentives that lie in the activity itself, *purpose-related incentives* lie in the result of an action. Part I of this thesis explores incentives as predictors of sport commitment and well-being. Part II considers the dynamics of incentives. Altogether six studies were conducted. The two correlative field studies and the experimental study of Part I demonstrate that human behaviour is driven by both types of incentives (activity- and purpose-related incentives) but activity-related incentives are stronger predictors of well-being and sport commitment. The experimental study additionally shows that positive incentives can be induced and with them their positive effects on commitment and well-being. In Part II three correlative field studies reveal the dynamics of incentives. The first study is based on a cross-sectional design, the second and third study are longitudinal studies over two weeks and six months, respectively. All studies demonstrate that incentives differ in the initiation and the maintenance phase of exercise behaviour: Athletes report more activity-related incentives in the maintenance phase of exercising than in the initiation phase. Additionally, the two longitudinal studies predict whether an individual continues sport exercising or not. Taken together, the present thesis expands research on incentives in respect of three aspects. First, they stress the importance of distinguishing activity- and purpose-related incentives. Second, they underline that activity-related incentives are stronger predictors of exercise behaviour. Finally, they pinpoint the dynamics of incentives over the time and demonstrate that maintainers differ from non-maintainers in the existence of activity-related incentives.

Acknowledgement

First of all, I would like to show deep gratitude to Dr. Julia Schüler, for giving me the opportunity to conduct this research. Her great mentoring, her support in many different ways and her trust in me were very valuable for me at all stages of my work. Second, I thank Prof. Veronika Brandstätter for her scientific advice and friendly support during my work in her department. Special thanks also to all my colleagues at the Department of Psychology and especially to Sabine Backes for the fruitful and supportive conversations. This thesis could not have been realized without financial support. I thank the Swiss Federal Council of Sports (Eidgenössische Sportkommission, ESK), the Federal Office for Sport Magglingen (Bundesamt für Sport Magglingen, BASPO) and the Foundation of Suzanne and Hans Biäsch for the promotion of Applied Psychology (Stiftung Suzanne und Hans Biäsch, Angewandte Psychologie). Data collection of this thesis was conducted in different sport institutions such as Jazzercise Berne, ASVZ, Olympica Brig-Glis, university sport of Berne and the clinic of rehabilitation of Leukerbad. Their friendly and generous support was very important for this thesis. Further I am deeply grateful for Janek Lobmaier's helpful comments on the manuscript. I would also like to thank my parents, my friends and my sister for their understanding, encouragement and support through the last years. Finally, my deepest thanks go to Oli. His love and his sympathy support me in every single way.

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Introduction

In motivation psychology two sources of energy contribute to goal-striving behaviour (McClelland, 1985). The first source contains personal factors such as needs and motives which want to be satisfied. The second source is based on factors which develop from person-environment interactions. These situational factors are called incentives and are the most important construct in the present thesis.

A core-question of motivation psychology is how selected goals can be pursued persistently. Although incentives are considered to be important determinants of human behaviour, their role has so far been limited to behaviour initiation (e.g., Tolman, 1952; Rotter, 1954; Vroom, 1964; Edwards, 1954; Heckhausen & Rheinberg, 1980). The present thesis extends research on incentives by additionally analyzing incentives in the maintenance of behaviour. Maintaining behaviour is especially important in exercise behaviour. This specific behaviour is defined as a repeated course of action with natural interruptions between two exercise situations. To predict long-term exercising the present thesis differentiates between *activity-related incentives* and *purpose-related incentives* (Rheinberg, 1989, 2007). The concomitance of both incentive types is investigated in Part I by examining whether continuous exercising is more likely when based on both types of incentives rather than on only one type. Part II evaluates whether incentives differ in the initiation and in the maintenance phase of behaviour.

Before explaining the conducted studies, the involved concepts and the two incentive types in more detail, the introduction begins with a brief overview on exercise behaviour and its positive effects on health. Then incentives as relevant determinants of human behaviour are focused on and the most influential motivational theories are described.

Exercise behaviour and long-term effects

The present thesis focuses on exercise behaviour because it is goal-orientated, repeatedly executed, and it is characterized by high effort and persistence. Exercise behaviour is therefore highly suitable for an analysis of motivation psychology. Additionally, sport exercising is commonly seen as an important health related behaviour. Researchers agree that sport activity has positive effects on physiological health (Paffenbarger, Hyde, Wing & Hsieh, 1986; Berlin & Golditz, 1990; Saltin, 1990), psychological health (Biddle & Mutrie, 2001; O'Connor, Raglin & Martinsen, 2000; Mutrie, 2000) and well-being (Biddle, Fox & Boutcher, 2000; Biddle & Mutrie, 2001). Researchers also agree that the positive effects of exercising are not the result of single exercise activities, but the result of complex mechanisms that require the maintenance of exercise behaviour over a long period of time. For example, to reduce the risk of a heart attack, physical fitness must be built up on the long-term. Similarly, regular exercise behaviour is crucial to influence psychological health, for example to decrease symptoms of anxiety or depression (Fuchs, 2003; Mutrie 2000; Landers & Arent, 2001; O'Connor, Raglin & Martinsen, 2000). The same is true for psychological well-being. Sporadic sport activities enhance the well-being only for a short time, namely two to five hours (Brown, 1990; Schwarzer, 2004), whereas long-term well-being requires the maintenance of exercise behaviour over a longer time period (Schwarzer, 2004). Thus, only the maintenance of exercise behaviour guarantees its positive effects.

But the high drop-out ratio of sport programs (Marcus, Dubbert, Forsyth, McKenzie, Stone, Dunn & Blair, 2000; Wing, 2000b) shows that precisely the maintenance of exercising is difficult. The present thesis assumes that incentives are a main factor to maintain behaviour. Research has emphasized that positive incentives such as the feeling of competence in a specific sport activity and trim (e.g. Fuchs, 1997;

Coakley & White, 1992), the perception of improved skills, or just having fun (e.g. Burton & Martens, 1986) are important to improve the commitment to continue sport exercising.

Incentives

Incentives determine the attractiveness of goal-striving and the appeal of an action. Traditionally, incentives are described as important determinants of behaviour (e.g., Atkinson, 1957; Blodgett, 1929; Bolles, 1975; Crespi, 1942; Hull, 1951; Schmalt, 2000; Tolman & Honzik, 1930, Vroom, 1960). They are defined as stable characteristics of the environment or person-environment interactions that people seek out (McClelland, 1985). According to this view behaviour is energized and directed (McClelland, 1985; Schmalt, 2000). In human goal-striving incentives characterize what a person wants or desires (see Heckhausen & Rheinberg, 1980). Theories that stress the role of incentives in the regulation of goal-related behaviour can be classified in *incentive theories* and *expectancy-value theories*.

According to *incentive theories* the concepts of intrinsic motivation and flow-experience are highly relevant. Intrinsic and extrinsic motivation has been studied by various researchers (e.g., Deci & Ryan, 1985; Ryan, Frederick, Lepes, Rubio & Sheldon, 1997; Sansone & Smith, 2000; Shah & Kruglanski, 2000). A specific behaviour can basically be executed for two reasons. If a behaviour is intrinsically motivated the activity is performed for itself and for the pleasure deriving from participation (Deci, 1971). The behaviour is therefore driven by internal incentives like *the feeling of competence* and *self-determination* (Ryan & Deci, 2000). In extrinsically motivated behaviour the activity is engaged as a means to an end and not for its own sake

(Vallerand & Rousseau, 2001). Such behaviour is determined by external incentives like *avoidance of negative consequences* or *appreciation by others* (Ryan & Deci, 2000).

Csikszentmihalyi (1988) took up the idea of intrinsic motivation and described a subjective state which an individual may encounter during an activity. He calls this internal incentive flow-experience. People report flow “when they are completely involved in something to the point of forgetting time, fatigue, and everything else but the activity itself” (Csikzentmihalyi & Rathunde, 1992, p.59). Flow is an intrinsically rewarding experience that results when an activity is done for its own sake, independent of its consequences.

Together, the concepts of intrinsic motivation and flow-experience aptly describe the role of incentives in human action. Internal incentives have an enjoyable rewarding experience-quality which drives an action by its own sake.

A second group of theories stressing the importance of incentives are *expectancy-value theories* (e.g., Rotter, 1954; Vroom, 1964; Edwards, 1954; Heckhausen & Rheinberg, 1980). Here, not only the subjective value of a goal (incentive), but also the subjective probability of realization is taken into consideration. Expectancy-value theories were originally developed in the context of achievement. An influential expectancy-value theory is the risk taking model (Atkinson, 1957, 1964). This model assumes that the motivation of individuals to initiate a specific behaviour is the product of the probability of success and the incentive of success. An individual will initiate certain behaviour when the probability of success as well as the incentive of success is high enough. All expectancy-value theories have in common that human motivation takes into account what a person wants and desires (incentive) and the subjective feasibility of this behaviour. When incentive and feasibility are high, so is the tendency of action. In this sense, incentives are highly relevant when initiating a specific behaviour and choosing a goal.

The Extended Cognitive Model (Heckhausen & Rheinberg, 1980) is a further model which takes the concept of incentives and the concept of expectancies into consideration and connects them to each other. Here, human action is described as a sequence of four components, (a) the situation in which an action takes place, (b) the action itself, (c) the outcome of the action, and (d) the consequence of the result. The model describes three types of expectancies (situation-outcome expectancies, action-outcome expectancies and outcome-consequence expectancies) and the role of incentives of consequence. Expectancy types and incentives of consequence determine the grade of tendency of action. Only if outcome-consequence expectancies and incentive of consequence are strong enough, the attractiveness of an outcome is influenced and this behaviour is more likely to be initiated (Rheinberg, 2006).

Whereas incentive theories and expectancy-value theories only focus on the action itself or the initiation of behaviour the Extended Cognitive Model additionally considers further variables which influence the execution of the action. The following paragraph describes models that consider human behaviour in complex action courses.

Incentives over the course of action

Models describing human behaviour in a complex action course differentiate between motivational phases and volitional phases of human behaviour. In these models incentives are only considered to be relevant in the motivational phase. One model that differentiated between motivational and volitional phases is the Rubicon-Model of Action Phase (Gollwitzer, 1990; Heckhausen, 1987a; Heckhausen & Gollwitzer, 1987). According to this model the course of action consists of four phases, starting with the pre-decisional phase where expectancy and incentive considerations take place. Here, the positive and negative incentives of different action alternatives and their feasibility

are weighted and compared to each other. Similar to the expectancy-value theories, the action alternative which gets the best evaluation referring to positive valence of incentives and feasibility is prioritized and becomes an intention. With the process of intention formation the motivational phase ends and the action process passes over into the volitional phases of action. By this, also the role of incentives ends. The volitional phase is conceptualized as being free of deliberations and instead as being focussed on the realization of the intention. In the first volitional phase the action is planned (post-decisional phase) and in the second it is performed (action phase). The post-actional phase again is a motivational phase. It finishes the action course with an evaluation of the whole action course. In the Rubicon-Model incentives directly determine the intention formation (Gollwitzer, 1999). But incentives are not assumed to determine the action of behaviour.

A similar assumption can also be found in theories of health psychology. Like the Rubicon-Model the Health Action Process Approach (HAPA) (Schwarzer, 1992, 2001; Garcia & Mann, 2003; Luszczynska & Schwarzer, 2003) suggests that the adoption, initiation, and the maintenance of health behaviour are conceived as a process with a motivation and a volition phase. In the motivation phase, an individual forms an intention to either adopt health-related behaviour or to change it. In the following volition phase the individual decides how the desired health behaviour should be implemented before the action is executed. Therefore, the motivation phase describes what people choose to do while the subsequent action (volition) phase determines how hard and how long people persist (see Schwarzer, 1992, 1999, 2001).

Together, both models allow incentives to be important in the motivational phase of action in which incentives are deliberated. A high value of incentives is crucial for a binding choice of a goal (Ach, 1935; Heckhausen & Gollwitzer, 1987; Kuhl, 1984; Lewin, 1926) and to improve the commitment to it. With the choice of a goal the role of

incentives ends. Once the goal is chosen incentives are considered as relative stable determinants which do not change over the action and the maintenance phase of human behaviour. The volitional phase of action is important to assure that the focused intention can be implemented. At this time planning processes are highly relevant. Also part of the volition phase is the execution of behaviour.

Summing up, taking all previously mentioned theories together they provide important indications how *incentives* determine human behaviour, but they leave some questions open. Each theory considers only certain aspects of the role of incentives and none of the theories postulate an influence of incentives on the behaviour maintenance. So, (1) in incentive theories incentives are only postulated to be relevant in the *execution* of a behaviour. (2) In the Extended Cognitive Model incentives are considered in the *consequence* of an action (purpose-related incentive). Additional to the neglected effect of incentives in behaviour maintenance, nothing is said about incentives in the action itself (activity-related incentive). (3) Expectancy-value theories consider incentives for *behaviour initiation* and for *goal-choosing processes* only, not for the regulation of goal-directed action. (4) Similarly, models of action phase like the Rubicon-Model and the HAPA allow incentives to be relevant in *intention formation* and *behaviour initiation* but they do not consider incentives in the maintenance phase of human behaviour. Additionally, those models consider incentives as relative stable determinants of human behaviour that do not change during the course of action.

The present thesis agrees with the approach that incentives are important determinants of human behaviour, but considers the role of incentives more systematically. The thesis aims at contributing to the research on incentives by suggesting three theoretical extensions. The first extension is the further differentiation of incentives. In the present thesis two qualitatively different types of incentives are considered to predict behaviour (cf. Rheinberg 1989). On the one hand activity-related

incentives lie in the action itself (see (1) incentive theories). Purpose-related incentives on the other hand lie in the consequence of an action (see (2) the Extended Cognitive Model). Both incentive types are described in more detail in Part I of this introduction. The second extension refers to the point of time when incentives become relevant for behaviour (see (3) expectancy-value models and (4) models of action phase). Whereas expectancy-value theories and models of action phase postulate incentives in the behaviour initiation this thesis aims at additionally analyzing incentives in the maintenance phase of action. The last extension suggests thinking about incentives as dynamic determinants rather than as stable characteristics (see (4) models of action phase).

More precisely, the first part of this thesis is concerned with an analysis of the two types of incentives, their prediction of exercise behaviour and well-being, and the concomitance of both types in exercising (first extension). The second part focuses on the two types of incentives in beginners and maintainers of exercising (second extension) and reveals that incentives change over the time (third extension). Both parts are described in the following paragraphs.

Part I: An analysis of two incentive types

In the previously described models only a single incentive (e.g., the incentive of success in risk taking model, Atkinson, 1957) is assumed to be responsible for an action. In contrast, Vroom's theory of instrumentality (VIE-model, 1964) stresses a variety of incentives to determine human behaviour. The model was conceptualized to explain behaviour in professional contexts. According to the VIE-model, the probability of a specific behaviour depends on multitude consequences (incentives) that can be connected with an action outcome. In the example of exercise behaviour individuals

exercise (outcome) in the presence of different positive incentives (e.g., loosing weight, improving self-esteem or health). In the present thesis the assumption of multiple incentives is extended by distinguishing two different incentive types: activity-related and purpose-related incentives. Rheinberg (1989, 2007) postulated these incentives to be two important types of incentives that drive human behaviour. Purpose-related incentives describe positive evaluated consequences of an action (Crespi, 1942, 1944; Vroom, 1964; Hull, 1952). By virtue of purpose-related incentives an action is primarily executed because of its agreeable consequences (e.g., loosing weight, doing something for health, making new friends). In contrast, activity-related incentives are independent of the result of this action. According to activity-related incentives the attractiveness of activities lies for example in the feeling of freedom (Gebauer, 1999), in the adventure (Rheinberg, 1989) or in the relaxation (see Rheinberg, 1989). Already 90 years ago Bühler (1922) suggested two different reasons for human behaviour. Observation of children's behaviour made him differentiate between the desire of working during the action and the feeling of satisfaction at the end of the action. Bühler's research fell in oblivion for many years until Rheinberg (1989, 2007) resumed these ideas. He called the desire of working during the action an activity-related incentive and the feeling of satisfaction at the end of the action a purpose-related incentive (Rheinberg, 2006). Rheinberg (1989) investigated activity- and purpose-related incentives in the learning context. He showed that the examination of activity- and purpose-related incentives enhances the power to predict learning behaviour. Only few studies investigated the differential impact of activity- and purpose-related incentives. Moreover, the theoretical distinction of incentive types has so far only been applied in learning context. Other contexts have to be tested as well in order to corroborate these concepts and their role in behaviour regulation.

Therefore the present thesis focuses on exercise behaviour and analyzes which incentive type predicts exercising behaviour more accurately. Further, although Rheinberg (1989) differentiates between the two incentive types, he does not comment on the maintenance of behaviour. In his research he does not examine whether a behaviour that is driven by both incentive types is continued for a longer period of time compared with the presence of only one type of incentives. It is plausible to assume that if activity- and purpose-related incentives come together a person is more committed to continue this behaviour than if only one of both types is present. On the other hand it is also possible that either a high amount of activity-related incentives or a high amount of purpose-related incentives is sufficient to be committed to behaviour maintenance. Both possibilities are tested in Part I.

To recapitulate, the first part of the present thesis assumes that human behaviour is driven by multiple incentives. It postulates the differentiation of two qualitatively different types of incentives, activity- and purpose-related incentives, which predict exercise behaviour differentially. A systematic analysis of incentives investigates the concomitance of the two incentive types in exercise behaviour. It is examined whether the two types work together or not. Part II additionally considers the dynamic aspect of incentives.

Part II: Dynamic incentives

Whereas researchers agree that the initiation phase differs in many respects from the maintenance phase of behaviour (e.g., Carver & Scheier, 1990, 1996; Dishman, 1984; Marcus, Dubbert, Forsyth, McKenzie, Stone, Dunn, et al., 2000; Rothmann, 2000; Gollwitzer & Oettingen, 2000; Schwarzer, 1999), theoretical and empirical analyses of incentives have yet been limited to the initiation of behaviour. Thus, expectancy-value

theories (e.g., Tolman, 1952; Rotter, 1954; Vroom, 1964; Edwards, 1954; Heckhausen & Rheinberg, 1980) as well as the Rubicon-Model of Action Phase (Gollwitzer, 1990; Heckhausen, 1987a; Heckhausen & Gollwitzer, 1987) have analyzed the role of incentives in intention formation only. The present part extends this idea by analyzing incentives in the initiation as well as in the maintenance phase of human behaviour.

In the Rubicon-Model the role of incentives ends in the motivational phase with intention formation. Incentives do not allow influencing the volitional phases and therefore the maintenance of behaviour. At first sight the theoretical framework of motivational and volitional phases of action in the Rubicon-Model of Action Phase contradict our assumption of incentives having an effect in the maintenance phase of behaviour. But this contradiction is easily dissolved by considering the fact that complex human behaviour, such as long-term exercising, is not a single action course. It consists of multiple sequences of action units. Each action unit ends with the motivational phase of action evaluation. This process is based on weighting positive and negative incentives of the action and its result. Theoretically, the evaluation phase allows incentives to have an influence on whether or not the behaviour will be performed again. From this point of view, our assumption that incentives play a role in the maintenance phase of behaviour is compatible with the Rubicon-Model of Action Phases.

A health model allowing incentives to be active in the maintenance phase is the Transtheoretical Model (TTM, e.g., Prochaska & DiClemente, 1983, 1992). The decisional balance describes the weighting of positive and negative incentives, called the Pros and Cons, of behaviour change. The postulated stages of change are characterized by a different decisional balance. In the precontemplation stage (individuals do not think about behaviour change) and in the contemplation stage (individuals think about changing a specific behaviour in the next six months) the cons of behaviour change overweigh the pros. In the action phase the opposite is the case.

The pros clearly overweigh the cons. This difference between pros and cons becomes much clearer in the maintenance phase. The TTM is only supported by descriptive findings and do not allow conclusions about the causal influence of incentives on behaviour. The causal influence of incentives is discussed in Part II.

Incentive theories like the theory of intrinsic motivation and flow-experience lead to the conclusion that as soon as an incentive drives human behaviour the incentive remains stable and do not change anymore. Part II assumes the opposite and stresses the dynamics of incentives. In that sense incentives are likely to change during the initiation and the maintenance phase of behaviour. This assumption is based on findings revealing that incentives which initiate behaviour and incentives that sustain behaviour are not necessarily the same (Rothmann, 2000; Woodworth, 1918). Some incentives are not salient at the beginning of an activity. Rather, they have to be discovered in the interaction with the activity (Deci & Ryan, 1985; Csikszenmihalyi, 2000; Rheinberg, 1989, 2006). Empirical support for the dynamic character of incentives was provided by research on flow-experience. According to Rheinberg (2006) the flow state can only be experienced when individuals have reached a level of skills that enables them to perform action units easily and automatically. Part II shows that the two incentive types (activity- and purpose-related incentives) differentially enhance from the initiation to the maintenance phase of human behaviour.

To recapitulate, the second part of the present thesis emphasizes the role of incentives in the initiation as well as in the maintenance phase of behaviour. The key message of this part is the dynamics of incentives in the sense that incentives are not stable across the time but vary. According to the first part the two incentive types (activity-related and purpose-related incentives) are analyzed and their different enhancement from the initiation to the maintenance of exercise behaviour is shown.

Part I

An analysis of two incentive types as predictors of commitment and well-being taking sport exercising as an example [1]

[1] The studies reported in this part were supported by a research grant from the Swiss Federal Council of Sports (Eidgenössische Sportkommission, ESK) and the Federal Office for Sport Magglingen (Bundesamt für Sport Magglingen, BASPO) awarded to Julia Schüler

Abstract

Present research systematically examined the role of incentives in sport commitment and well-being by differentiating between activity-related incentives and purpose-related incentives. Assuming that activity- and purpose-related incentives have different rewarding-effects for behaviour we expected activity-related incentives to be stronger predictors of commitment and well-being than purpose-related incentives. A second hypothesis tested whether commitment and well-being is stronger when individuals experience both activity- and purpose-related incentives as opposed to individuals experiencing only one incentive type. Three studies in the domain of sports were conducted. Study 1 (N = 129) found that activity-related as well as purpose-related incentives were important predictors of commitment and well-being and supported our assumption that activity-related incentives were stronger predictors than purpose-related incentives. In Study 2 (N = 67) either activity-related incentives or purpose-related incentives were experimentally induced. Again, we found stronger effects of activity-related incentives on commitment and well-being compared to purpose-related incentives. Study 3 (N = 61) mainly replicated the superiority of activity-related incentives and revealed that commitment and well-being is not experienced as strongly when based on both rather than on only one incentive type.

Introduction

Traditional researchers on motivation assume incentives to be important determinants of behaviour (Atkinson, 1957; Hull, 1952; Lewin, 1926; Blodgett, 1929; Tolman & Honzig, 1930; Vroom, 1964). Incentives were described as emotionally arousing stable characteristics of person-environment interactions that people seek out (McClelland, 1987) and that stimulate and direct human behaviour (McClelland, 1985; Schmalt, 2000). Influential models of motivation that consider incentives as essential to choose a goal are expectancy-value (= incentive) theories (e.g., Rotter, 1954; Vroom, 1964; Edwards, 1954; Heckhausen & Rheinberg, 1980). In these theories incentives are highly relevant to form an intention of behaviour. Similarly, in the Rubicon-Model of Action Phases (Heckhausen & Gollwitzer, 1987) incentives are important in the pre-decisional phase in which different action alternatives and their feasibility are weighted and compared to each other. The action with the highest priority referring to incentives and feasibility is chosen and an intention that commits to perform this behaviour is formed. The present research agrees with those incentive approaches in the sense that incentives determine human behaviour. It aims to contribute to research by suggesting two theoretical extensions.

The first extension refers to the differentiation of incentives. Traditional research on motivation (e.g. McClelland, Atkinson, Clark & Lowell, 1953; Feather, 1961) considered either *single* incentives to predict behaviour (Atkinson, 1957; McClelland, 1985) or analyzed *a variety* of incentives to determine human behaviour but neglected their specific contents (Valence-Instrumentality-Expectancy model VIE, Vroom, 1964). In the present research we use two qualitatively different types of incentives to predict sport commitment and well-being. We differentiate between *activity-related incentives* and *purpose-related incentives.* Rheinberg (1989) postulated that these two types of

incentives are important sources that drive human behaviour. In addition to Rheinbergs' (1989) theorizing we examined whether one type of incentive is a stronger predictor than the other.

The second extension refers to the concomitance of these two types of incentives. Rheinberg (1989) did not examine whether a specific behaviour is more likely when based on both types of incentives rather than on only one type. We aim at testing two conflicting assumptions. First, we examine whether commitment as well as well-being is enhanced when activity-related incentives as well as purpose-related incentives come together. Second, we investigate whether commitment and well-being is more likely if only one type of incentive is present, either activity-related incentives or purpose-related incentives, respectively.

A systematical analysis of incentives seems to be important when attempting to predict specific human behaviour like regular sport activity. Regular exercise has well-known effects on physiological health (Paffenbarger, Hyde, Wing & Hsieh, 1986; Berlin & Golditz, 1990; Saltin, 1990), psychological health (Biddle & Mutrie, 2001; O'Connor, Raglin & Martinsen, 2000; Mutrie, 2000) and well-being (Biddle, Fox & Boutcher, 2000; Biddle & Mutrie, 2001). Despite these positive effects, every second participant of sport-programs fails to complete the program (Marcus, Dubbert, Forsyth, McKenzie, Stone, Dunn & Blair, 2000; Wing, 2000b). This high drop-out ratio additionally stresses the importance to analyze determinants of sport commitment. The two theoretical extensions to research on incentives are discussed in more detail in the following paragraphs.

The differentiation into activity-related incentives and purpose-related incentives

Traditional research on motivation postulated that an action is only attractive and meaningful because the result of this action is attractive (Crespi, 1942, 1944; Vroom 1964; Hull, 1952). Accordingly, in research on achievement motivation (Atkinson, 1957; McClelland, 1985), incentives were conceptualized as the anticipated affect of pride that occurs when individuals successfully reach an achievement goal. In short, in this research tradition the source of the incentives is the anticipated desired end-state. This is in line with the Extended Cognitive Model (Heckhausen & Rheinberg, 1980; Figure 1), in which incentives are also conceptualized as the consequence of an action result. The model describes human action as a sequence of four components that are illustrated in Figure 1 (see boxes).

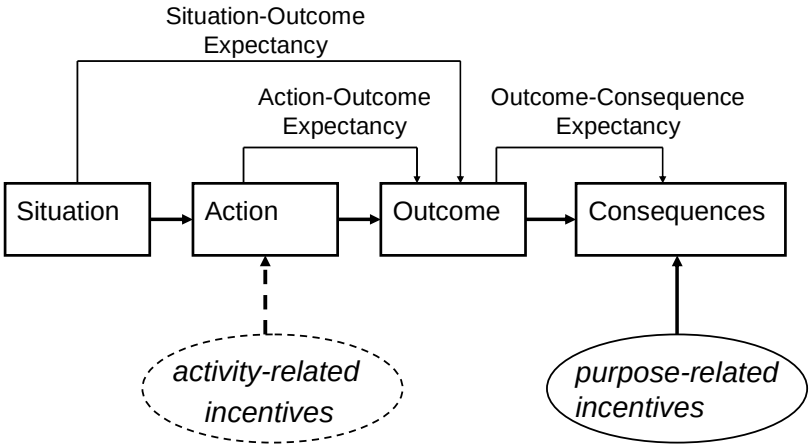


Figure 1. Revision of the Extended Cognitive Model with the two types of incentives (adapted from Rheinberg, 1989)

The first component is the situation in which an action takes place. The second is the action itself. The third component is the outcome of the action and the last one is the

consequence of the result that represents the purpose incentive. The model assumes human behaviour to be more likely when the incentive is highly positive and additionally the action-outcome expectancy and outcome-consequence expectancy is high and the situation-outcome expectancy is low.

For our line of argumentation it is important, that the Extended Cognitive Model explained human motivation by purpose incentives (see solid line in Figure 1). For the example of sport, a runner exercises because he wants to win a prize or a young woman works-out because she cares about her body weight. Rheinberg (1989) revised the Extended Cognitive Model by postulating that human behaviour is also driven by a second type of incentive that lies in the action itself (see dotted line in Figure 1; for this type of incentive see also Bühler, 1922; Koch, 1956; Woodworth, 1918; Rheinberg, 2006). Incentives of this type are called *activity-related incentives* (in German *Tätigkeitsanreize*) whereas the incentives concerning the results are called *purpose-related incentives* (in German *Zweckanreize*) (Rheinberg, 2006, 2007).

Rheinberg (2000) not only postulated activity-related incentives within the domain of sports (e.g., having fun and enjoying movements while performing a sport-activity), but also in other leisure activities (e.g., playing music for fun), in learning situations (e.g. being highly interested) and in work (e.g., feeling absorbed by action) (Rheinberg, 1989; Csikszentmihalyi & LeFevre, 1989). Rheinberg (2000) assumed that also purpose-related incentives such as improving health or winning a prize in competition (sport), being proud of oneself because of having played a piece of music flawlessly (leisure), getting a good grade (learning situation) or earning money (work) are important to determine behaviour. Interestingly, Rheinbergs' (2000) theorizing did not suggest that one type of incentive might be a stronger predictor than the other. Thus, it is unclear whether for example having fun (activity-related incentive) or improving health (purpose-

related incentive) better predicts sport commitment and well-being. We will discuss this issue in the paragraph on different effects of activity- and purpose-related incentives.

Another aspect warrants discussion. According to Rheinberg (1989), activity-related incentives can occur together or separately. Taking sport as an example, an individual may exercise because he or she wants to have fun (activity-related incentive) and additionally wants to improve health (purpose-related incentive), whereas another individual may do sports just because of fun without being interested in health improvement. Yet another individual may do sports just because of improving health without having fun while exercising. In other words, it seems as though human behaviour can be driven either by one type of incentives or by both types of incentives. Interestingly, Rheinberg (1989) did not examine whether the concomitance of both incentive types may facilitate commitment of behaviour and well-being more than if just one of both incentive types is present. This issue will be discussed in a separate paragraph below.

The different effects of activity-related incentives and purpose-related incentives

We assume activity-related incentives to be stronger predictors of sport commitment and well-being than purpose-related incentives due to a simple rational. Activity-related incentives (having fun, enjoying movements) are positive experience-qualities that immediately reward the activity they are associated with. In contrast, purpose-related incentives (improving health, loosing body-weight) are rewards that often occur much later, long after the activity has been finished. According to the principle of operant conditioning (Skinner, 1938), a close time-association between the reward and the activity has stronger rewarding effects than less close time-associations (e.g., Grice, 1948; Tarpy & Sawabini, 1974; Shanks & Dickinson, 1991) and thus should be a better

predictor the activity will be performed again. This positive quality of activity-related incentives should also lead to a better well-being. Activity-related incentives therefore are assumed to have a stronger effect on sport commitment as well as on well-being than purpose-related incentives.

These assumptions are supported by research on intrinsic motivation. Research on intrinsic motivation that conceptualize intrinsic motivation as motivation that derives from the pleasure while performing the activity and extrinsic motivation as motivation that derives from the desired end-states (Deci & Ryan, 1985) is conceptually similar to our approach of activity- and purpose-related incentives. This similarity of the conceptualization allows speculating about similarities concerning the results. Intrinsic motivation was found to be a better predictor of exercise-maintenance than extrinsic motivation (Ingledew, Markland & Medley, 1998; Ryan, Frederick, Lepes, Rubio & Sheldon, 1997). Furthermore, several studies found a positive relationship between intrinsic motivation and higher investment of effort (Pelletier, Fortier, Vallerand, Tuson, Bière & Blais, 1995; Williams & Gill, 1995) and a higher willingness to maintain an activity (Goudas, Biddle & Underwood, 1995; Oman & McAuley, 1993). Intrinsic motivation was also found to predict positive affects (e.g, McAuley & Tammen, 1989; Scanlan & Lewthwaite, 1986; Brière, Vallerand, Blais & Pelletier, 1995; Li 1999), as for example satisfaction (see Pelletier et al., 1995) or positive emotions (see Brière et al., 1995). Whereas the stronger effects of intrinsic motivation compared to extrinsic motivation has been convincingly demonstrated, less has been written about why the effects of intrinsic motivation are so much stronger than the effects of extrinsic motivation. We attempt to fill this gap by discussing the different rewarding power of both incentive types.

Do two types of incentives facilitate sport commitment and well-being?

When asking participants why they exercise it seems easy for them to list a variety of incentives as for example having fun, feeling great while exercising, improving health or control body-weight (e.g. Gould & Petlichkoff, 1988; Biddle & Mutrie, 1991). Interestingly, activity-related incentives and purpose-related incentives are often mixed up. This was already reported by Rheinberg (1989) and was also observed by Csikszentmihalyi and Rathunde (1992, p. 58) who concluded that "[…] intrinsic and extrinsic motivation, are not mutually exclusive, and they can be present in consciousness at the same time". Although Barron and Harackiewicz (2000, p.252) explicitly ask for research "that go beyond pitting one type of motivation against the other ([…] as intrinsic motivation vs. extrinsic motivation) to understand how multiple sources of motivation may contribute to optimal functioning", analyses of whether both types of incentive work together are still missing.

With this research we attempt to investigate whether individuals are higher committed to behaviour and show a better well-being when this behaviour is based on activity- and purpose-related incentives, rather than just on one of them. At first sight this seems plausible, because purpose-related incentives (e.g., body-weight-reduction) could compensate the temporary loss of the activity-related incentive (e.g., having no fun due to temporarily frustration). Vice versa, activity-related incentives (having fun) could compensate the temporary loss of purpose-related incentives (e.g., currently not as much body-weight reduction as expected). According to these considerations sport commitment and well-being would be encouraged by two mechanisms which can temporarily compensate each other. If this *compensation-hypothesis* is right, the results should reveal that having activity- and purpose-related incentives together shows

stronger effects on sport commitment and well-being than having just one of both incentive types.

At second sight, other predictions could be made by considering learning theory. According to the principle of intermittent reinforcement incentives should not loose their rewarding power when they not occur regularly, but even work stronger when they sporadically reinforce the behaviour (for the strong rewarding effects of intermittent reinforcement see Andersen & Redd, 1980; Ferster & Skinner, 1957). That is, either activity- or purpose-related incentives would be enough to predict sport commitment and well-being: Even when incentives do not occur regularly they (more than ever) manage to reward the activity. If this *intermittent reinforcement-hypothesis* is right, the results should reveal that having either activity- or purpose-related incentives have the same effect than having both incentive types. In the present research we test the compensation-hypothesis against the intermittent reinforcement-hypothesis.

Present research

Present research aims at testing the two hypotheses that have been embedded above. First, we assumed activity-related incentives to be stronger predictors of sport commitment and well-being than purpose-related incentives, because of their different rewarding-effect. Second, we tested whether the two qualitatively different types of incentives facilitate sport commitment and well-being more than just one of them. Three studies were conducted to test our assumptions. Study 1, a correlative field study, was conducted to test our preposition that incentives are indeed important predictors of sport commitment and of well-being. Study 2 was conducted to test whether activity-related incentives are stronger predictors than purpose-related incentives. For this, we experimentally induced both incentive types following a procedure used by Brandstätter

(2003). Using an imagination task Brandstätter (2003) showed that focusing on incentives of goal-related behaviour (regular sport exercising) led to a higher maintenance than focusing on non-goal-related behaviour (non-regular sport exercising). Adapting this procedure to our research question, we asked our participants to focus either on activity-related incentives or on purpose-related incentives. We postulated that incentives can be experimentally induced and with them their positive effects on commitment and well-being. Further, we assumed that participants who focused on activity-related incentives would report a better well-being and a higher commitment to exercising than participants who focused on purpose-related incentives.

Study 3 was a correlative field study and was conducted to test again whether activity-related incentives are stronger predictors than purpose-related incentives. Additionally its correlative design allowed testing the compensation-hypothesis against the intermittent reinforcement-hypothesis.

In order to increase confidence in the robustness of findings, we varied the measurements and samples across our studies. Thus, the three studies used participants of different sport activities. Participants of Study 1 were badminton players, participants of Study 2 and 3 group-fitness athletes. Additionally, the three studies used different indicators of sport commitment and well-being. Because incentives were the core-construct of our research, we tried to obtain converging results with different measures of incentives. Study 1 used a badminton-specific incentive questionnaire that was developed on the basis of half-standardized interviews with badminton-players in a pre-study. In Study 2 incentives were induced using an experimental manipulation based on an imagination task. In Study 3 incentives were assessed by directly asking participants for their ideographical activity- and purpose-related incentives.

Study 1: Incentives as predictors of sport commitment and well-being

Study 1 was conducted to test our preposition that incentives are an important predictor of sport commitment and of well-being. We assumed activity-related incentives to be stronger predictors of the dependent variables than purpose-related incentives. The fact that incentives were assessed by a questionnaire that was especially developed for the context of badminton distinguishes this study from previous studies on incentives. The questionnaire is the result of a pre-study that is summed up shortly in the following paragraph.

Pre-Study of Study 1

Not all incentives fit to every kind of sport. For example, the incentive of enjoying team atmosphere only applies to team-sports and not to individual sports. The incentive to enjoy nature only fits outdoor- but not to indoor sports. Thus, although different kinds of sports surely share common incentives (e.g. fun, health, body weight reduction), there seem to be special incentives for each kind of sport. To take this into account we developed an incentive questionnaire specifically for the sport-sample we wanted to analyze (Steiner, 2006). Therefore, we modified an interview procedure used by Rheinberg (1993, 2004b) and interviewed four female and five male badminton players with competition experience and different performance levels for their incentives in badminton sports. The average age of the participants was 37.4 years (*SD* = 10.2) and the average playing experience was 20.5 years (*SD* = 10.9). Participants were assisted to generate incentives by questions as “Can you remember a perfect day, when everything went great – what were the characteristics of this situation?”. The interview lasted about twenty minutes and was recorded and transcribed. Two raters coded the mentioned incentives in activity-related incentives and purpose-related incentives. The

first co-rating had an agreement of 83.3%. After discussing the disagreements, the percentage of agreement was 97.9%. The badminton-players reported a mean of 10 purpose-related incentives (*SD* = 3.6) and a mean of 26.7 activity-related incentives (*SD* = 8.2). The athletes often mentioned the feeling of optimal challenge (*N* = 37), feeling of competence (*N* = 24) or having fun (*N* = 22) as activity-related incentives. Success (*N* = 26) or fitness (*N* = 11) were often mentioned as purpose-related incentives. In order to create a questionnaire, the statements of the interview were reformulated into 62 items which represented a broad spectrum of activity-related and purpose-related incentives in badminton sport. Because participants reported more activity-related incentives than purpose-related incentives, the questionnaire contained 44 items of activity-related incentives and 18 items of purpose-related incentives.

Method of Study 1

Participants and Procedure

Participants were 129 non-professional badminton players (46 women and 83 men) of different performance levels from Swiss and German clubs. Nine participants had to be excluded from the study due to missing data. There was no difference between the excluded participants and participants among variables. The average age of the sample was 22 years (*SD* = 10.3). Most of the badminton players could be categorized into advanced players, playing badminton for more than eight years. Data were collected by administering a questionnaire at the beginning of a regular training session. Here, participants filled in the specific incentive questionnaire for badminton described above and answered questions concerning sport commitment and well-being.

Measures

Measurement of incentives. The pre-study mentioned above revealed a questionnaire consisting of 62 items measuring incentives in badminton. 44 items assessed activity-related incentives for example *"I like to train hard"* or *"while playing badminton I like the physical challenge"* or *"I like to feel my physical limits"*. 18 items concerned of purpose-related incentives for example *"Badminton offers me the opportunity of success"* or *"Playing badminton helps me to feel better in my everyday life".* Each incentive had to be rated on a 7-point scale (1 = *disagree completely* and 7 = *agree completely*). An index for activity-related incentives and purpose-related incentives were created by computing the mean of all activity-related incentive items (α = .90) and all purpose-related incentives items, respectively. The indexes matched good internal consistencies (α = .82).

Measurement of positive well-being. Positive well-being was assessed by positive affect items used by Brunstein (1993). Participants were asked to indicate how they felt at this moment and they rated four adjectives (happy, pleased, content and glad) on a 7-point response scale (1 = *not at all* and 7 = *extremely*). All four items at the beginning of the lesson were summed up and the mean was computed (α = .79).

Measurement of commitment. Sport commitment was assessed by the item *"How often is it the case that you don't go to the sport activity even if you had planned to".* The item had to be rated on a 5-point scale with endpoints labelled *not at all* (1) and *extremely* (5). The item was recoded so that a high score on this item means a high commitment.

Results of Study 1

Preliminary analyses showed that neither age nor sex of participants influenced the results reported below. Table 1 shows descriptive statistics, two-tailed correlations and internal consistence among variables.

Table 1. *Descriptive Statistics and Pearson-Correlations among Variables (Study 1).*

	2	3	4	*M*	*SD*	*A*
1. Activity-related incentives	.66**	.32**	.31**	4.77	.57	.90
2. Purpose-related incentives		.23*	.20*	4.20	.74	.82
3. well-being			.11	5.01	.96	.79
4. commitment [1]				1.67	.74	[2]

Note. [1] Correlation with variable calculated by Spearman

* $p < .05$. ** $p < .01$.

[2] Cronbachs Alpha could not be computed because commitment was measured by a single item.

As predicted, results showed that activity-related incentives were related to commitment ($r = .31$, $p < .01$). Also, purpose-related incentives were significantly related to commitment ($r = .20$, $p < .05$), indicating that a high amount of incentives was associated with a high sport commitment. The high correlation between activity-related incentives and purpose-related incentives ($r = .66$, $p < .01$) indicated a high amount of shared variance. To disentangle common variance a linear regression analysis was conducted in which both types of incentives were simultaneously entered into the regression equation. Results showed that the total model was significant ($R^2 = .08$, *F*

(2,118) = 4.90, $p < .01$) indicating again that incentives were predictors of commitment. Activity-related incentives predicted sport commitment significantly positive ($\beta = .24$, $p = .05$), whereas purpose-related incentives did not predict commitment ($\beta = .06$, *n.s*). These results suggest that activity-related incentives are a stronger predictor of sport commitment than purpose-related incentives.

The same pattern of results could be shown for positive well-being. Both types of incentives were related to well-being ($r = .32$, $p < .01$ *and* $r = .23$, $p < .05$). The results of linear regression showed that the total model was significant ($R^2 = .10$, F (2, 118) = 6.61, $p < .01$). Activity-related incentives predicted well-being significantly positive ($\beta = .26$, $p < .05$), whereas purpose-related incentives did not predict well-being ($\beta = .03$, *n.s.*).

Brief discussion of Study 1

Study 1 totally confirmed our hypotheses. The models of our regression analyses confirmed that incentives are important predictors of sport commitment and of well-being. Additionally, we could show that in a (sport) situation several incentives can be simultaneously salient and meaningful. Thus, it was easy for badminton-players in the pre-study to list activity-related incentives as well as purpose-related incentives. Furthermore, the results of linear regression analyses in which the common variance of both incentive types were controlled, indicated that activity-related incentives and purpose-related incentives can be differentiated from each other. As expected, activity-related incentives were better predictors than purpose-related incentives.

One limitation of Study 1 was the correlative design that could not definitely show a causal effect of the incentives on commitment and well-being. In order to definitely demonstrate the direction of the relationship between incentives and sport commitment

and well-being, respectively, Study 2 used an experimental design. Another limitation is the measurement of sport commitment by a single item, Study 2 added one more item.

Study 2: The experimental induction of incentives and its consequences

Although in one situation several incentives may be salient and meaningful (e.g., Heckhausen & Gollwitzer, 1987) the same incentive may not necessarily be important for every single person. So having fun might be a meaningful incentive for one person but not for another. This was taken into account in the following study. It was based on an experimental design using a valuable induction that was simple, efficient and not time-consuming. A special feature of the induction was that we did not induce any incentive. In contrast, the induction considered on an individual and for the person existing incentive. We used a modified procedure by Brandstätter (2003) who could show that athletes who were instructed to focus on incentives of regular sport exercising reported a higher maintenance and a higher activation than athletes who focused on incentives on non-regular sport exercising. In the present research we asked participants either to focus on a salient and personal activity-related incentive *or* on a salient and personal purpose-related incentive.

Like in Study 1 we assumed activity-related incentives to be stronger predictors of sport commitment and well-being than purpose-related incentives. We hypothesized that focusing on the most important individual activity-related incentive should improve sport commitment and well-being more than focusing on the most important individual purpose-related incentive.

Method

Participants and Procedure

67 group-fitness athletes (60 female and 7 male) from centers in Bern and Brig-Glis (Switzerland) participated in a study on “motivation and experience of sport activity”. The average age of the sample was 35.97 years (*SD* = 11.82). Data were collected in three phases. In the first phase participants were recruited after an exercise lesson (T1) by the experimenter who explained the procedure of data collection in detail. Athletes who agreed to participate in the study received a take-home booklet which contained questionnaires assessing sport commitment and well-being. This booklet was given back to the experimenter in the next week’s exercise lesson. Here, the second phase of data collection started (T2). Participants filled in a questionnaire which contained the experimental manipulation. Participants were randomly assigned to either the activity-related incentive group (*N* = 26) or the purpose-related incentive group (*N* = 41). Due to a mistake in data-collection the groups differ in the number of participants. To check the manipulation we assessed the participants’ identification with the situation. After the induction participants performed their exercise as usual. Directly after the lesson well-being and commitment were assessed again (T3).

Experimental manipulation

Two experimental manipulations were constructed. One considered activity-related incentives, the second purpose-related incentives. The procedure of activity-related incentives is exemplarily described in detail: In the first part, participants were informed about agreeable aspects during exercising (called activity-related incentives) and were requested to imagine a typical exercise lesson. Afterwards they were asked to write down their personal aspects during exercising:

"Now, please focus on agreeable aspects (incentives) you encounter during exercising. Imagine a typical exercise lesson. Please, concentrate on the enjoyable and positive aspects, which are very important for you during exercising. It could be fun or enjoyment of movements or the feeling of your body or something else. It is important that you mention aspects which are very important to YOU. Now, please fill in your personal aspects in the table below. If you cannot think of more aspects you can leave the lines blank."

In the second part participants focused on the most important activity-related incentive they had listed previously. They were asked to describe their feelings and thoughts concerning this incentive. This part is based on a procedure used by Oettingen (1997):

"Now, please choose the most important and most agreeable aspects of your written down aspects (see table). Imagine this aspect as well as you can. How meaningful is this aspect for you? Try to feel how agreeable this aspect is. Describe your feelings and thoughts."

The same procedure was applied for the purpose-related incentive group, except that participants listed and focused on purpose-related incentives. Participants were informed about agreeable aspects after the exercise (called purpose-related incentives) like for example doing something for health or the feeling of achieving something. Afterwards they imagined a typical exercise lesson and listed their personal purpose-related incentives. Finally, they focused on the most important incentive and wrote down their feelings and thoughts concerning this incentive.

Measures

Measurement of positive well-being. The participants' well-being was assessed at home (T1) to have a baseline of well-being for each participant and it was measured again directly after the exercise lesson (T3). It was assessed by positive affect items used by Schallberger (PANAVA; 2000). Participants were asked to indicate how they felt in general. They rated each of the four adjectives "shiftless", "wide awake", "enthusiastic" and "afraid", on a 7-point scale. The adjectives "shiftless" and "afraid" were recoded. All four adjectives were summed up. The index of well-being at T1 (α_{T1} = .79) as well as at T3 (α_{T3} = .66) matched sufficient internal consistencies.

Measurement of commitment. Sport commitment was assessed at home (baseline) by the item *"How often is it the case that you don't go to the sport activity even if you have planned to"*. Additionally the item *"How much are you looking forward to the training lesson"* was applied. Both items had to be rated on a 7-point scale with endpoints labelled *not at all* (1) and *extremely* (7). The first item was recoded. Because of intercorrelations (r = .54, p < .001 for T1) the mean of both items was computed, representing an index of commitment at T1. Commitment was again assessed after the exercise (T3) by the item *"How much are you looking forward to the training lesson"* and by the modified item *"How possible is it that you won't go to the sport activity in the future even though you planned to"*. Both items were again rated on a 7-point scale with endpoints labelled *not at all* (1) and *extremely* (7). The second item was recoded. Because of the intercorrelations (r = .42, p < .01 for T3) the mean of both items was computed, representing an index of commitment at T3.

Results

Preliminary analyses showed no difference between men and women in any of the assessed variables and no correlations between age and any of the assessed variables. The manipulation check item (identification with the situation) did not correlate with the dependent variables. Furthermore, the groups did not differ in this item F (1, 66) = .66, p = .42, n^2 = .01). Sport commitment assessed at home (baseline, T1) correlated highly with commitment after the training lesson (T3) (r = .64, p < .001). Thus, commitment at T1 was controlled in further analyses with commitment at T3 as dependent variable. Similarly, well-being at T1 correlated highly with well-being T3 (r =.53, p < .001) so that well-being at T1 was controlled in further analyses with well-being at T3 as the dependent variable. Further, well-being at T1 was related to commitment at T1 (r = .24, p = .05) and T3 (r = .32, p < .01) and well-being at T3 also correlated with commitment at T1 (r = .29, p < .05) and commitment at T3 (r = .38, p < .01).

In order to test the effect of the intervention on sport commitment, an ANOVA with commitment at T1 as covariate, the two experimental groups as a between-subjects-factor and commitment at T3 as the dependent variable was conducted. Results showed a main effect for the experimental groups (F (2, 66) = 3.55, p = .06, n^2 = .05), indicating that focusing on activity-related incentives led to a higher sport commitment (M = 6.40; SD = 0.60) than focusing on purpose-related incentives (M = 6.01; SD = 1.03) (see Figure 2). The covariate commitment at T1 also reached significance (F (2, 66) = 53.08, p < .001, n^2 = .45).

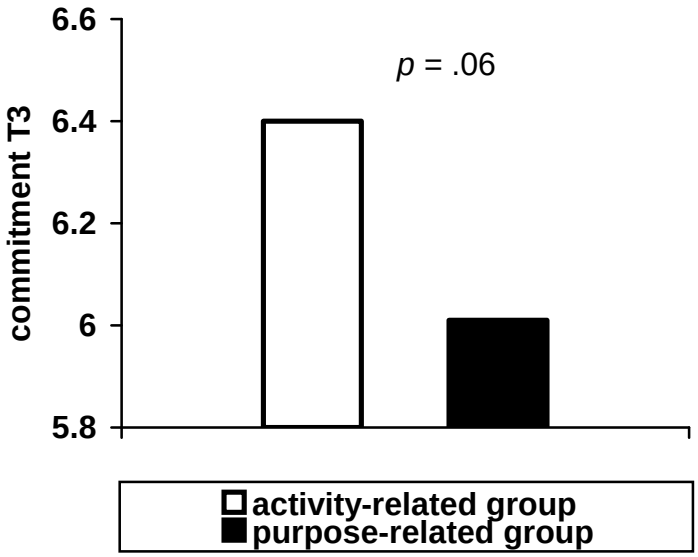


Figure 2. Differences in commitment at T3 between the activity-related incentive group and the purpose-related incentive group controlled commitment at T1 (Study 2).

A second ANOVA was conducted to test whether the activity-related incentive group and the purpose-related incentive group differed in well-being. Well-being at T1 was controlled as a covariate. Results showed a significant group effect (F (2, 66) = 6.95, $p < .05$, $\eta^2 = .10$), indicating again that participants who focused on activity-related incentives showed a better well-being after the training lesson (M = 23.78; SD = 3.46) than participants who focused on purpose-related incentives (M = 22.15; SD = 3.77) (see Figure 3). The covariate well-being at T1 also reached significance (F (2, 66) = 22.24, $p < .001$, $\eta^2 = .26$).

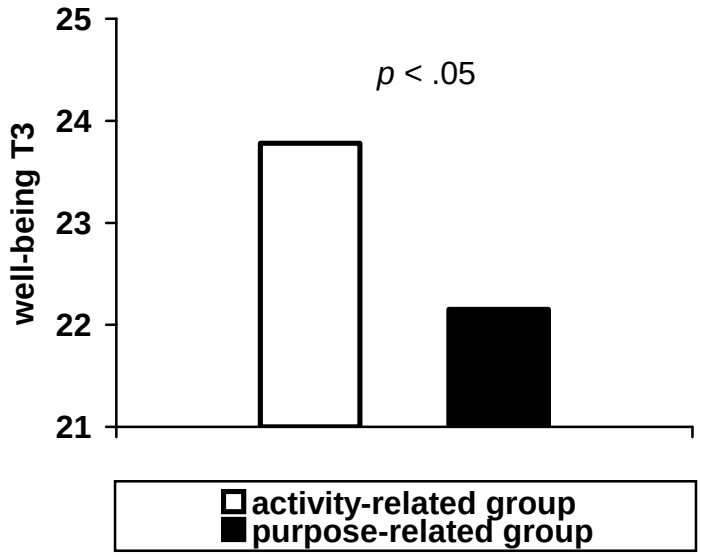


Figure 3. Differences in well-being at T3 between the activity-related incentive group and the purpose-related incentive group controlled well-being at T1 (Study 2).

Brief discussion

Study 2 confirmed results of Study 1 suggesting that activity-related incentives are more important for exercise behaviour than purpose-related incentives. The study was an extension to the first study, because the stronger effect of activity-related incentives was evoked with an experimental design. When focusing on an individual and salient activity-related incentive well-being and sport commitment was improved more than when focusing on an individual and salient purpose-related incentive. The postulated difference between purpose-related and activity-related incentives was analyzed more precisely than in Study 1.

The experimental approach additionally revealed that both types of incentives can be induced. Hence, our assumption was confirmed that two qualitative different incentive types exist and that only a systematical analysis of incentives can explain

human behaviour. But the study still left the question open whether the two types of incentives work together in a way that the concomitance of both incentive types enhances sport commitment and well-being more than when just one of both incentive types is present. Therefore, the following study was designed to replicate results of Study 1 and 2 and to additionally examine whether sport commitment and well-being is stronger when individuals have activity- as well as purpose-related incentives (compensation-hypothesis) compared to individuals having just one of both incentive types (intermittent reinforcement-hypothesis).

Study 3: Testing the compensation-hypothesis against the intermittent reinforcement-hypothesis

The pre-study of Study 1 and other interviews with athletes (Schüler & Brunner, 2006) showed that participants reported activity-related incentives as well as purpose-related incentives. When asking participants why they exercise they typically list a variety of incentives, including both types of incentives (see Rheinberg, 1989; Velicer, DiClemente, Prochaska & Brandenburg). Study 1 confirmed our hypothesis that multiple incentives predict sport commitment and well-being. Activity-related incentives were stronger predictors of sport commitment and well-being than purpose-related incentives. Study 2 additionally showed that both types of incentives can be induced. However, neither of the studies managed to reveal whether the two types work together. Therefore, an added value of Study 3 was to analyze the concomitance of both incentive types. Two hypotheses were tested against each other. The compensation-hypothesis predicts that purpose-related incentives compensate for the temporary loss of activity-related incentives, and respectively, activity-related incentives compensate the temporary loss of purpose-related incentives. If this compensation-hypothesis is

true, the results should reveal that having both types of incentives (activity- as well as purpose-related incentives) effects in stronger sport commitment and well-being than just having one of both incentive types. In contrast, the intermittent reinforcement-hypothesis postulates that incentives do not loose their rewarding power when they not occur regularly. In fact they should even work stronger when they sporadically reinforce the behaviour. If this hypothesis is true, the results should reveal that having either activity- or purpose-related incentives is sufficient to predict sport-commitment and well-being. A concomitance of both incentive types should not reveal a stronger effect.

In order to optimize our incentive measure in Study 3, we tried to overcome limitations connected to the incentive measure in Study 1. The most critical point in Study 1 was that measuring incentives on the basis of interviews turned out to be a very time consuming procedure. Thus, a more economic way to measure incentives had to be found. It could also be argued that by using an incentive-questionnaire participants were forced to rate their amount of agreement to incentives generated by other athletes and these might not correspond with their own personal incentives. Additionally, an important individual incentive might not be considered in the questionnaire, although it has highly motivating function for another athlete. In order to take individual incentives into account and to employ a more economical incentive measure, Study 3 measured incentives ideographically by simply asking participants for their incentives. Further, Study 3 measured the commitment with two similar items.

Method

Participants and Procedure

Participants were asked to fill in a questionnaire at home including demographic variables like age and sex, sport commitment and well-being. 61 group-fitness athletes

(39 female and 22 male) from centers in Bern and Zurich were recruited to participate in a study on “motivation and experience in sport activity”. The average age of the sample was 42 years (*SD* = 16.35; *range* = 21 to 75 years).

Measures

Measurement of incentives. Participants were informed that incentives of exercising can be systematized into two incentive types, agreeable aspects during exercise (called activity-related incentives) and agreeable aspects after the exercise (called purpose-related incentives). For each incentive type an example was given. After this explanation participants were asked to fill in two fields. One field concerned on activity-related incentives, the other on purpose-related incentives. The order of these two fields was randomized among participants. Participants were requested to fill in their individual incentives in the blank lines provided at the end of each field. They could write down as many incentives as they wanted and had the possibility to leave lines blank. Examples for activity-related incentives mentioned by participants were having fun, enjoying movements of the body and feeling the power. Examples for purpose-related incentives were doing something for health and control of body-weight. All participants filled in the two fields but did not fill in all lines. For each of the two fields the number of listed incentives was used as either the activity-related incentive score (*M* = 4.30, *SD* = 1.88) or the purpose-related incentive score (*M* = 4.61, *SD* = 1.92). The scores did not differ significantly (*t* (60) = 1.10, *p* = .27).

Measurement of positive well-being. To assess well-being the same four items were administered as in Study 2 (PANAVA; Schallberger, 2000). Participants rated each of the four adjectives (shiftless, wide awake, enthusiastic and afraid) on a 7-point scale.

The adjectives “shiftless” and “afraid” were recoded. All four adjectives were summed up. The index matched sufficient internal consistencies (α = .61).

Measurement of commitment. Sport commitment was assessed using the items *“I can’t imagine giving up this sport activity soon”* and *“I probably won’t do this sport activity much longer”.* Participants rated each item on a 7-point response scale (1 = *does not apply at all,* 4 = *applies partly* and 7 = *applies completely*). After recoding the second item, the mean of both items was computed, representing the index of sport commitment (r = .76, p < .001).

Results

Preliminary analyses showed no difference between men and women in any of the assessed variables and no significant differences in age. Furthermore, the order of the presentation of incentives in the incentive measure revealed no difference. In order to replicate the results of Study 1 that activity-related incentives are stronger predictors of well-being and commitment we conducted correlation analyses among variables. Table 2 shows descriptive statistics and two-tailed correlations among variables.

Table 2. *Descriptive Statistics and Pearson-Correlations among Variables (Study 3).*

	2	3	4	*M*	*SD*
1. Activity-related incentives	.33**	.12	.23+	4.3	1.88
2. Purpose-related incentives		-.04	-.03	4.61	1.92
3. well-being			.16	19.21	3.69
4. commitment[1]				5.96	1.31

Note. [1] Correlation with variable calculated by Spearman

+ $p = .08$. ** $p < .01$.

Activity-related incentives were related to commitment ($r = .23$, $p = .08$), whereas purpose-related incentives were not ($r = -.03$, $p = .80$). A similar pattern of results could be found for well-being, although the correlations did not reach significance. Activity-related incentives were higher related to well-being ($r = .12$, $p = .36$) than purpose-related incentives ($r = -.04$, $p = .78$).

In order to test the concomitance of the two types of incentives, we employed hierarchical regression analyses. Participants' commitment was analyzed by entering both types of incentives as a first Step into the regression equation, followed by the multiplicative interaction of both incentives types (Step 2). The results (Table 3) showed that the interaction was a good predictor of the commitment. The effect was marginally significant ($b = -.25$, $SE_b = .12$, $\Delta R^2 = .08$, t (60) = -1.86, $p = .07$). There was no significant main effect ($b_{activity\text{-}related} = .13$; $b_{purpose\text{-}related} = .03$).

Table 3. *Hierarchical Regression of Commitment (Study 3).*

Step	Variable	ΔR^2	*Df*	ΔF	*Beta*
1	Main Effects	.02	2,58	.55	
	activity-related incentives				.13
	purpose-related incentives				.03
2	activity-related x purpose-related	.08	1,57	3.45+	-.25+
	Cumulative R^2	.97	3,60	1.54	

Note. Beta is the standardized regression coefficient in the regression equation.

+ p = *.07.*

To substantiate the nature of this pattern, we employed the procedure proposed by Cohen, Cohen, West, and Aiken (2003), in which values at one standard deviation above or below the mean of continuous predictor variables are entered in the regression equation. The result of this procedure is illustrated in Figure 4.

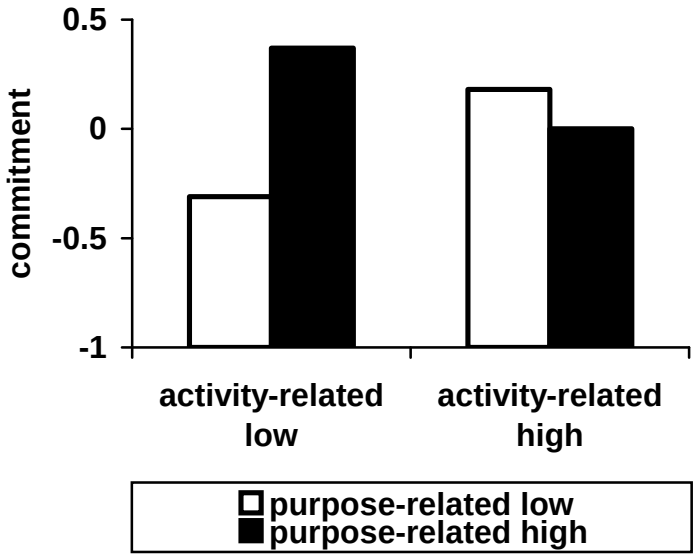


Figure 4. The concomitance of activity-related incentives and purpose-related incentives for sport commitment (Study 3).

Individuals who reported either only activity-related incentives (activity-related high/purpose-related low; empty bar on the right side of Figure 4) or only purpose-related incentives (purpose-related high/activity-related low; filled bar on the left side of Figure 4) did not differ in sport commitment from individuals which had activity-related as well as purpose-related incentives (activity-related high/purpose-related high; filled bar on the right side of Figure 4). Additionally, there was no difference in commitment whether participants reported activity-related incentives (activity-related high/purpose-related low; empty bar on the right side of Figure 4) or purpose-related incentives (purpose-related high/activity-related low; filled bar on the left side of Figure 4). Results indicated that having either activity- or purpose-related incentives are sufficient to commit to exercise. Supplementary post hoc analysis employing a variant of the Johnson-Neyman technique (see Aiken & West, 1991, p.132) confirmed the descriptive result pattern. There was no significant difference between athletes with both incentive types and athletes with purpose-related incentives (t (60) = 2.34, p = .26, two-tailed test) or athletes with activity-related incentives respectively (t (60) = 2.11, p = .83, two-tailed test). Additionally, there was no significant difference between athletes with only one of the both incentive types (t (60) = 2.11, p = .83, two-tailed test).

Participants' well-being was analyzed by a similar regression approach, in which both incentive types were entered as a first Step into the regression equation, followed by the multiplicative interaction of both incentive types (Step 2). The results (Table 4) showed that the interaction was a good predictor of well-being. The effect was marginally significant (b = -.19, SE_b = .12, ΔR^2 = .08, t (60) = 1.91, p = .06). There was no significant main effect ($b_{activity\text{-}related}$ = .16; $b_{purpose\text{-}related}$ = -.17).

Table 4. *Hierarchical Regression of Well-being (Study 3).*

Step	Variable	ΔR^2	*Df*	ΔF	*Beta*
1	Main Effects	.02	2,58	.61	
	activity-related incentives				.16
	purpose-related incentives				-.17
2	activity-related x purpose-related	.08	1,57	3.65+	-.19+
	Cumulative R^2	.99	3,60	1.64	

Note. Beta is the standardized regression coefficient in the regression equation.

+ p = .06

To substantiate the nature of this pattern, we calculated predicted values of well-being using the regression weights from the final regression equation by employing the procedure proposed by Cohen et al. (2003) (see above). The result of this procedure is illustrated in Figure 5.

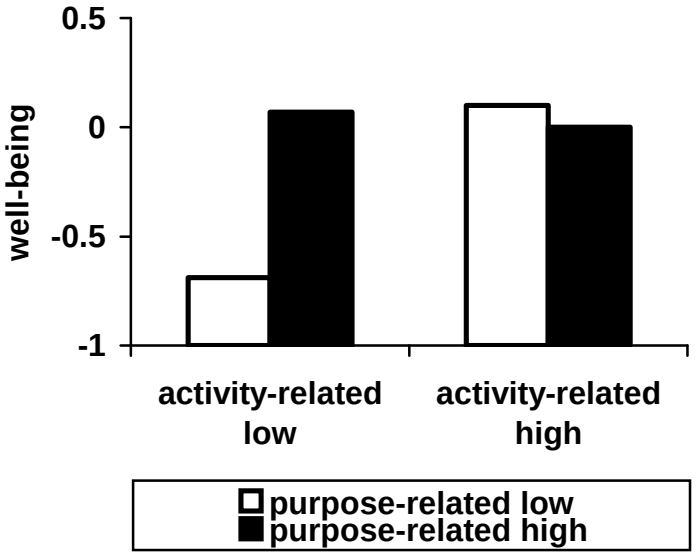


Figure 5. The concomitance of activity-related incentives and purpose-related incentives for well-being (Study 3).

Individuals who reported either only activity-related incentives (activity-related high/purpose-related low; empty bar on the right side of Figure 5) or only purpose-related incentives (purpose-related high/activity-related low; filled bar on the left side of Figure 5) did not differ in well-being to individuals which had activity-related as well as purpose-related incentives (activity-related high/purpose-related high; filled bar on the right side of Figure 5). Additionally, there was no difference in well-being between participants who reported activity-related (activity-related high/purpose-related low; empty bar on the right side of Figure 5) and participants reporting purpose-related incentives (purpose-related high/activity-related low; filled bar on the left side of Figure 5). Again, the results indicated that having either activity- or purpose-related incentives are sufficient to report a good well-being. Supplementary post hoc analysis employing a variant of the Johnson-Neyman technique (see Aiken & West, 1991, p.132) confirmed the descriptive result pattern. Athletes with both incentive types did not differ from athletes with only one incentive type (purpose-related incentives t (60) = - 1.56, p = .12, two-tailed test, activity-related incentives t (60) = -1.22, p = .23, two-tailed test). Additionally, there was no significant difference between athletes with one of the both incentive types (t (60) = -1.21, p = .23, two-tailed test).

Brief discussion

Correlations of Study 3 confirmed the results of Study 1 and 2 suggesting that activity-related incentives are a stronger predictor of commitment and well-being, even if results of well-being failed significance. Again, the study underlined the postulated rationale that activity-related incentives like having fun or enjoying movements are positive experience-qualities that immediately reward the activity they are associated with. Results of regression analyses showed that sport commitment and well-being is

ensured by only one incentive type. In our example, either just having fun (activity-related incentive) or just the incentive to reduce body weight (purpose related-incentive) is sufficient to be committed to a sportive behaviour and to report a good well-being. The results refuted our assumption that incentives can temporarily compensate one another and that both types of incentives work together.

Study 3 was an important extension to the studies reported earlier, not only because we tested the concomitance of incentives and their effect on sport commitment and well-being but also because of measuring incentives in a more economical and ideographically way than Study 1. Such a measurement allows the reporting of personal and salient incentives.

General Discussion

Having fun, competing with others, loosing weight, making new friends, feeling muscular power, all these are incentives athletes reported in a Pre-Study of Study 1. Three studies with different athletes (badminton-players and group-fitness athletes) confirmed that within a single sport situation several incentives can be simultaneously salient and meaningful. Having a closer look at these different incentives shows that one commonality is that they can be categorized into two types of incentives, activity-related incentives and purpose-related incentives (see Rheinberg, 1989, 2006). This differentiation into two incentive types extends classical approaches to incentives which focused mainly on single incentives associated with the result of an action (e.g., Crespi, 1942, Heckhausen, 1977). All our studies showed that the differentiation into activity-related incentives and purpose-related incentives is worthwhile, because they predict sport commitment and well-being differently.

According to the regularities of operant conditioning present research expressed the difference between both types of incentives on commitment and well-being: Activity-related incentives are closer time-associated with the activity than purpose-related incentives and thus were assumed to have a stronger rewarding effect on the sport commitment and well-being compared to purpose-related incentives. This stronger rewarding effect could be found in all three studies and for different sport activities (badminton and group-fitness), underlining the robustness of our findings. In Study 1 results revealed a higher correlation between activity-related incentives and commitment and well-being compared to purpose-related incentives and the dependent variables commitment and well-being. In the regression analyses we disentangled common variance and confirmed that activity-related incentives are stronger predictors of commitment and well-being. Correlations of Study 3 further underlined the stronger effect of activity-related incentives. Study 2 not only confirmed this result, but also took the research on incentives one step further and showed that incentives can be experimentally induced and with them their positive effects on commitment and well-being. Imaging incentives like enjoying the movements or feeling the muscles and body (activity-related incentives) improved well-being and increased the commitment of sport in a better matter than imaging positive incentives like the good feeling of doing something for health (purpose-related incentives). In this study participants could be induced to imagine personal and important aspects of exercising by a simple manipulation (just listing personal incentives of exercising and focusing on the most important incentive). This result is of high practical implication. The possibility to make incentives more salient, for example by using a simple imagination task, and the fact that induced incentives have positive effects on people's behaviour and well-being, can be used in health programs or in other domains of human life, where it desirable to change behaviour and to maintain it over a longer period of time. For example, patients

in rehabilitation could be helped to implement their clinical training in everyday life or smokers could be supported on smoking cessation.

Study 3 contributes to research on incentives in at least one more aspect. Results showed that having either activity- or purpose-related incentives have the same effect as having both incentive types. Just having fun (activity-related incentive) or just the incentive to reduce body weight (purpose related-incentive) is sufficient to be committed to a sportive behaviour and to report a good well-being.

It is noteworthy that the present research obtained converging results using different measurements. The most fundamental differentiation between the studies is the way we measured incentives. In Study 1 we used a badminton-specific incentive questionnaire and in Study 3 we collected data with a qualitative measurement by asking participants about their personal incentives. A limitation of the present studies is the focus on positive incentives. Earlier research (Vroom, 1964, Lewin, 1931) showed that an event or an object possesses positive and negative incentives. Positive incentives endorse behaviour in contrast to negative incentives which discourage it. Thus, human behaviour is characterized by the approach of positive incentives and the avoidance of negative incentives (Elliot, Gable & Mapes, 2006; Higgins, 1997). Further research should investigate also the role of negative incentives on behaviour and well-being.

Although our hypotheses were examined taking exercise behaviour as an example we suggest that they should also be confirmed in other domains of human life where the commitment to behaviour is important, for example in learning contexts. If our results are transferable to this context, activity-related incentives like having fun in learning (Rheinberg, 1989) or interest in the topic (see Hidi, 2006; Rheinberg, 1989) will predict the commitment to the learning-activity more precisely than purpose-related incentives like achieving good marks or passing an examination. But even if purpose-

related incentives alone are experienced, the learning-activity could be continued because human behaviour can be driven by only one type of incentive, either activity- or purpose-related incentives. Therefore, either a high amount of activity- or a high amount of purpose-related incentives should be sufficient to be committed to the activity.

Part II

Dynamic incentives: The enhancement of activity-related incentive and purpose-related incentive and their influence on behaviour maintenance taking exercising as an example[2]

[2] Parts of Part II were supported by a research grant from the Foundation of Suzanne and Hans Biäsch for the promotion of Applied Psychology awarded to Sibylle Brunner.

Abstract

Incentives are important determinants of behaviour (Atkinson, 1957; McClelland, 1985). Although researchers agree that the initiation phase of behaviour differs in many aspects from the maintenance phase of behaviour (e.g., Carver & Scheier, 1990, 1996; Gollwitzer & Oettingen, 2000; Rothman, 2000), the analyses of incentives have yet been limited to the initiation of behaviour. In present research we analyzed incentives in the initiation as well as in the maintenance phase of action. We postulated that the incentives which initiate behaviour are not necessarily the same as those which sustain the maintenance of behaviour. We hypothesized incentives to be dynamic in the sense that activity-related incentives, which are inherent in an activity, first have to be detected while interacting with the activity itself and thus significantly enhance from the initiation to the maintenance phase. In contrast, purpose-related incentives, which are associated with the result of an activity, are expected to be more salient right from the initiation and thus should increase less. Additionally, due to their closer time-association with the activity itself, activity-related incentives should have a stronger rewarding effect on behaviour and thus are expected to predict behaviour maintenance better than the less time-associated purpose-related incentives. Three correlative field studies in the domain of sports were conducted. Study 1 (N = 68) demonstrated a stronger enhancement of activity-related incentives compared to purpose-related incentives and revealed activity-related incentives as better predictors of commitment to maintain. Study 2 (N = 67) and Study 3 (N = 68) replicated the stronger enhancement of activity-related incentives and additionally showed that only activity-related incentive enhancement, but not purpose-related incentive enhancement can predict if an individual maintains exercising or drops out of the exercise activity over a time period of two weeks (Study 2) and of six months (Study 3).

Introduction

The term *motivation* is derived from the Latin word *movere* which means *to move oneself* or *to move something*. In McClelland's classical book on human motivation (1985) he suggests that this movement is contributed by two sources of energy. On the one hand personal factors such as needs and motives which want to be satisfied *push* an individual. On the other hand, situational factors, called *incentives*, stimulate the motives and needs and thus contribute to the movement by *pulling* an individual (see also Lewin, 1931). Incentives are defined as "emotionally arousing stable characteristics of the environment or person-environment interactions that people seek out (positive incentives) or avoid (negative incentives)" (McClelland, 1985, pp. 180-181) and thereby energize and direct behaviour (McClelland, 1985; Schmalt, 2000). Classical and modern approaches to incentives agree with McClellands conceptualization of incentives as an important source of human motivation (e.g., Atkinson, 1957; Blodgett, 1929; Bolles, 1975; Crespi, 1942; Heckhausen, 1985; Hull, 1951; Schmalt, 2000; Tolman et al, 1930; Vroom, 1964). Present research refers to those approaches and aims at contributing to the research on incentives by suggesting three theoretical extensions.

The first extension refers to the point of time when incentives become relevant for behaviour. While influential models of motivation only consider incentives as important determinants for the *initiation of behaviour* (see below, expectancy-value theories; e.g., Tolman, 1952; Rotter, 1954; Vroom, 1964; Edwards, 1954; Heckhausen & Rheinberg, 1980), the present research aims at additionally analyzing incentives in the maintenance phase of behaviour.

The second extension is the application of a content-related differentiation of incentives. A further shortcoming of traditional research on motivation (e.g., McClelland, Atkinson, Clark & Lowell, 1953; Feather, 1961) is that either only single incentives were

analyzed as predictors of behaviour while the variety of incentives was neglected, or that the variety of incentives was considered, but their contents was not analyzed (Vroom's Valence-Instrumentality-Expectancy model, Vroom, 1964). In the present research two qualitatively different types of incentives (see Rheinberg 1989) are considered and are used to predict behaviour maintenance. Those incentives are the activity-related incentives (e.g., having fun) and the purpose-related incentives (e.g., doing something for health).

The third extension to the research on incentives is that incentives are suggested to be dynamic characteristics of the person-environment interaction rather than "stable characteristics of person-environment interactions" (McClellands 1985). This assumption derived from the empirical observation that individuals who successfully initiate behaviour often fail to maintain the behaviour over a certain amount of time (see Coakley & White, 1992; Pahmeier, 1994), indicating that the factors initiating the behaviour were unable to govern its maintenance (see Rothman, 2000). Assuming that incentives are the factors determining behaviour, we suggest that incentives are dynamic in the sense that they change from the initiation to the maintenance phase of behaviour. This idea was already postulated 90 years ago by Woodworth (1918) who theorized that the incentive initiating an activity does not necessarily energize the whole activity. "It simply leads the performer up to the act, but the motive force for the act itself must be inherent." (Woodworth, 1918, p.71). Woodworths' assumption of incentives as being inherent in the activity fits well into our conceptualization of activity-related incentives. We assumed that incentives are dynamic and that the two qualitative different incentives types (activity- and purpose-related incentives) change differently from the initiation to the maintenance phase of human behaviour.

An important domain of human life where the three theoretical extensions (that are (1) analyzing incentives in the initiation and maintenance phase, (2) differentiating

into activity- and purpose-related incentives and (3) assuming incentives to vary dynamically from the initiation to the maintenance-phase) are relevant is exercise behaviour. It is well-known that regular exercise promotes health and that a lack of exercising is a major risk factor for severe illnesses, ahead of all coronary heart diseases (e.g., Donker, 2000; Thompson, Buchner, Pina, Balady, Williams, Marcus et al, 2003). Despite this common knowledge, 80% of fitness-sports athletes (Brehm & Eberhardt, 1995, p. 174) and 50% of individuals who initiated exercising behaviour in a health oriented exercise course (e.g., Wing, 2000b, p.85) fail to maintain the behaviour and drop-out within the first six months. These findings underline the importance to analyze determinants of human behaviour, such as incentives and their role for behaviour initiation and behaviour maintenance. The three theoretical extensions to research on incentives will be discussed in more detail.

The role of incentives in the initiation and maintenance phase of behaviour

Expectancy-value models consider incentives as important determinants of behaviour (e.g., risk preference model Atkinson, 1957; VIE model Vroom, 1964; cognitive dissonance theory Festinger, 1942). These models are very influential in motivational psychology. They explain why an intention to perform a certain activity is preferred to alternative activity intentions and postulate that individuals decide to perform the activity with the highest positive incentive (= value) and which is additionally highly feasible (= expectancy). Thus, incentives are highly relevant for forming an intention. This approach on incentives was integrated in famous models of motivation such as the Rubicon-Model of Action Phases (Heckhausen & Gollwitzer, 1987). Although this model assumes that complex human actions consists of qualitatively different action phases

such as intention formation, planning, action and evaluation, the role of incentives was only considered in the intention formation phase.

Further, incentives are considered in theories predicting health behaviour change, as for example exercise behaviour (for a review, see Biddle & Nigg, 2000). Although the term *incentive* has seldom been used directly, the evaluation of incentives is often a core construct. For instance, in Banduras' (1986) *Social-Cognitive-Theory* incentives were referred to *outcome expectancies,* defined as beliefs regarding the relationship between specific levels of task performance and experienced outcomes. In Rogers' (1985) *Protection Motivation Theory* the *response effectiveness* represents the belief that a health-related behaviour will lead to the prevention of an illness. This can be interpreted as a positive incentive and strictly speaking, the response effectiveness itself is the perceived probability that the desired outcome will be received. In the *Health Belief-Model* (Becker, 1974; Rosenstock, 1966) *perceived benefits* and *perceived barriers* obviously correspond to the terms positive and negative incentives. Apart from their differences in labelling incentives, the health behaviour models share the basic assumption that incentives determine the intention formation of exercising (e.g., Godin, Cox & Shepard, 1983), which again is positively related to behaviour initiation (for reviews, see Bandura, 1997; Salovey, Rothman & Rodin, 1989). But, similar to the Rubicon-Model and expectancy-value models, none of the health behaviour models make direct reference to issues regarding the *maintenance* of behaviour. The reason for neglecting incentives in the maintenance phase lies in the theoretical distinction between *motivational phases* in which incentives are deliberated and into the *volitional*

phases of planning and action in which deliberating processes are theoretically excluded (see Rubikon-Model, Heckhausen & Gollwitzer, 1987)[3].

The Transtheoretical Model by Prochaska and colleagues (TTM; Prochaska & DiClemente, 1983, 1992) theoretically allows incentives to be active in the maintenance phase. The authors assume that individuals, who change their behaviour move through a series of pre-action stages (precontemplation, contemplation, preparation) that are followed by the action stage and the maintenance stage. The latter is operationalized by maintaining the behaviour change for more than six months. The authors assumed that the weighting of positive incentives (Pros) and negative incentives (Cons) of a specific behaviour ("decisional balance") is different across the stages of change. In longitudinal studies they analyzed 12 problem behaviours, among them exercise acquisition, and found that in the action phase the positive incentives clearly overweigh the negative incentives. From the action phase through to the maintenance phase the positive incentives increased while the negative incentives decreased (Prochaska, Velicer, Rossi, Goldstein, Marcus, et al., 1994). These findings are in accordance with our assumption that different incentives are present in the initiation and maintenance phase of behaviour (see also Marcus, Rakowski & Rossi, 1992). Our research extends Prochaskas' research in two aspects. First, Prochaskas' findings are just descriptive and did not allow conclusions about the causal influence of incentives on behaviour. We

[3] On first sight the theoretical exclusion of incentives in the action phase of the Rubicon-Model (Heckhausen & Gollwitzer, 1987) seems to contradict our assumption of incentives to be relevant in the action phase. This contradiction is easily dissolved by considering the fact that complex human actions, such as exercising on a regular basis, are not a single action course, but consist of multiple sequences of action units that each consist of the different phases of the Rubicon-Model and ends with the evaluation phase. The evaluation phase is a motivational phase that allows to deliberate incentives. This process of deliberation determines whether the activity is performed continuingly or not.

analyze causal relationships by testing whether incentives can predict exercise behaviour. This issue will be discussed in the paragraph on effects of incentive enhancement. Second, we differentiate into two different types of incentives which assumedly enhance the predictional power of incentives on behaviour. This issue will be discussed in the paragraph on the incentive enhancement from the initiation to the maintenance phase.

Studies directly testing whether incentives influence the maintenance of exercising revealed inconsistent results (for a review see Fuchs, 1997). For example, Dzewaltowski and colleagues did not find that incentives predict four weeks of physical activity participation (Dzewaltowski, Noble & Shaw, 1990), whereas Sallis and colleagues revealed incentives as predictors of exercise behaviour two years later (Sallis, Hovell, Hofstetter & Barrington, 1992). In a longitudinal study across 18 months, Fuchs (1994) identified three dimensions of positive incentives, health, social issues and body-weight/figure, and two dimensions of negative incentives, costs of exercising and worry. The health dimension and the cost dimension were the best predictors of long-term exercise behaviour.

To sum up, previous analyses on incentives have either been limited to the initiation phase and neglected the maintenance phase of behaviour, or they considered only the maintenance phase and revealed inconsistent results concerning the effects of incentives on behaviour. We extended reported research by testing the role of incentives in the initiation as well as in the maintenance phase of behaviour. Thus, we used a simple systematization based on the differentiation into activity- and purpose-related incentives.

Activity-related incentives and purpose-related incentives

Traditional research on motivation postulated that an action is attractive and meaningful because the result of this action is attractive (Atkinson, 1957; Crespi, 1942, 1944; Hull, 1952, McClelland, 1985, Vroom 1964). Thus, incentives were provided at the end of an action course and were connected to the result of action. This is also true for the Extended Cognitive Model (Heckhausen & Rheinberg, 1980) which describes different parts of human action courses (see boxes in Figure 6).

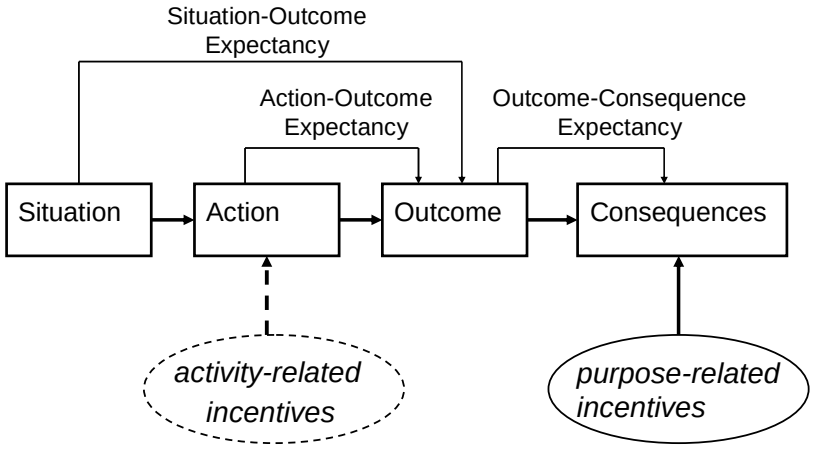


Figure 6. Revision of the Extended Cognitive Model with the two types of incentives (adapted from Rheinberg, 1989)

The first component is the situation in which an action takes place. The second is the action itself, the third is the result of the action and the fourth describes the consequence of the result. The consequences of an action result, as for example feeling proud because of having achieved a challenging goal, is a *purpose-related incentive* (see solid line in Figure 6). The different kinds of expectancies (high action-outcome expectancy, high outcome-consequence expectancy and low situation-outcome

expectancy) and the amount of positive purpose-incentives determine whether an individual performs a specific behaviour or not. A limitation of the Extended Cognitive Model brought Rheinberg (1989) to suggest a revision: The original model can not explain behaviour that is performed without purpose-related incentives, as for example driving a bike without a special goal, learning a new language for fun or making music as a non-professional. For that reason, Rheinberg (1989) concluded that purpose-related incentives can not be the only type of incentives for human behaviour. He assumed a second source of incentives that lies in the action itself, which he called *activity-related incentives* (see dotted line in Figure 6; see also Bühler, 1922; Koch, 1956; Woodworth, 1918). In the example of exercising, athletes may exercise because it is fun, because they enjoy the movements, like the feeling of muscular power, or because of other positive experiences while performing the activity. In Woodworth's (1918) words, those incentives are *inherent* in an activity.

For learning activities it was useful to differentiate between activity-related incentives and purpose-related incentives. Rheinberg (1989) could show that by adding activity-related incentives to the purpose-related incentives in the Extended Cognitive Model the power to predict learning activity was significantly enhanced. The enhanced predictional power is one reason why we used both, the purpose-related incentives and the activity-related incentives to predict exercise behaviour. Another reason is that we assume the differentiation into purpose- and activity-related incentives to be useful to measure incentive enhancement from the initiation to the maintenance phase.

The incentive enhancement from the initiation to the maintenance phase

Although Rheinberg's (1989) revision of the Extended Cognitive Model does not explicitly consider that incentives may vary from the initiation up to the maintenance phase of action, the enhancement of activity-related incentives from the one phase to

the other is plausible due to their nature. Most activity-related incentives need affective and somatic experiences with the activity itself (e.g. feeling great when performing a perfect movement) and thus can only develop when the activity is been performed regularly. A reason why activity-related incentives are less obvious than purpose-related incentives when starting to exercise may lie in their affective nature. Activity-related incentives are difficult to communicate and they often involve body-sensations (enjoying muscular power) or psychological sensations (feeling absorbed by action) and thus, they can not be anticipated when beginning to exercise. To sum up, activity-related incentives are *inherent* in the exercise activity (Woodworth, 1918) and first must be discovered through the interaction with the activity. Of course, some activity-related incentives might already occur at the beginning of an activity ("having fun from the beginning") or might be anticipated at the beginning of an activity ("The athletes look happy, maybe I also will be happy when performing that exercise."), but mostly, activity-related incentives should unfold their main effects in the maintenance phase of behaviour. In contrast, purpose-related incentives are more explicit from the beginning on and therefore can be easily anticipated. It is a matter of common knowledge that exercising improves health, regulates body weight and provides an opportunity to meet friends. They should enhance less from the initiation to the maintenance phase.

Empirical support for the dynamic character of activity-related incentives was provided by research on flow-experience. Flow-experience is an activity-related incentive that is defined as an optimal experience while performing an activity in which the actor is totally involved and forgets everything else except the activity itself (Csikszentmihalyi & Rathunde, 1992). According to Rheinberg (2006), the flow state can only be experienced in complex activities when individuals have reached a level of skills that enables them to perform action units easily and automatically. This *expertise effect* (Rheinberg & Manig, 2003) could be shown in the domains of sports (Bieneck, 1991),

making music (Siebert & Vester, 1990) and painting graffiti (Rheinberg & Manig, 2003). This supports our suggestion that activity-related incentives are more likely for maintainers (in this case *experts*) than for beginners of an activity.

Taking all theorizing and empirical evidence together, we hypothesize that incentives are dynamic in the sense that they change from the initiation to the maintenance of an activity, with activity-related incentives increasing more than purpose-related incentives.

The effects of incentive enhancement

Apart from showing the enhancement of incentives, another aim of the present research is to analyze the effects of incentive enhancement on the maintenance of behaviour. We assume that individuals, whose positive activity-related incentives increase while performing an activity, are more likely to maintain the exercise behaviour for a longer time-period than participants whose activity-related incentives do not enhance. The rationale behind this assumption is the following: The positive quality of activity-related incentives (e.g., having fun, enjoying movements, being absorbed by action) work as a direct reward for the activity. According to the principle of operant conditioning (Skinner, 1938), this should enhance the probability to perform the activity again. In contrast, positive purpose-related incentives such as loosing body-weight or making new friends are often long-term effects and can seldom be experienced immediately after the exercise behaviour. Even the few purpose-related incentives that occur directly after the exercise activity (e.g. feeling relaxed after exercising), are still less time-associated to the activity than activity-related incentives. Due to the less intense time-association with the activity, the rewarding effect of the purpose-related incentives should be much weaker than the effect of activity-related incentives (for the time-association between

action and reward see Grice, 1948; Tarpy & Sawabini, 1974; Shanks & Dickinson, 1991). Thus, individuals whose activity-related incentives do not increase from the initiation to the maintenance phase are missing an important source of motivation and are more endangered to disengage from the behaviour.

Summing up, we assume that the enhancement of positive activity-related incentives predicts exercise maintenance whereas no enhancement of positive activity-related incentives predicts drop-out. The enhancement of positive purpose-related incentives should leave behaviour maintenance unaffected.

Present research

Present research aims at testing the two hypotheses which were elaborated in the previous paragraphs. First, we assume that activity- and purpose-related incentives change differently from the initiation to the maintenance phase of exercise activity. Positive activity-related incentives are expected to increase more than positive purpose-related incentives. Second, activity-related incentive enhancement, but not purpose-related incentive enhancement should predict the maintenance of exercise behaviour.

Three studies were conducted to test these hypotheses. They have in common that they were all correlational field studies with athletes of fitness sports whose activity-related incentives and purpose-related incentives were measured as predictors of exercise behaviour. Apart from this common characteristic, the studies differed in a variety of aspects complementing each other in respect of theoretical and methodological aspects. Two aspects should be stressed. The first aspect is the study sample. The sample of Study 1 consisted of young students who participated in a fitness course offered by the University, whereas Study 2 measured incentives of rehabilitation patients that participated in exercise courses offered by the rehabilitation

centre. We chose these different samples to demonstrate that our assumptions of incentive enhancement are valid for individuals who assumedly initiated exercising with totally different initial incentives. Because students did exercising as a voluntary leisure activity, they might focus on having fun or other activity-related incentives, whereas participants that take part in the rehabilitation exercise-program are expected to initially focus on health which is a purpose-related incentive. Study 3 measured incentives among middle-aged Nordic Walkers for whom the variety of initial incentives were assumed to subsume activity- and purpose-related incentive to an equal amount.

The second aspect distinguishing the studies is the design. Study 1 is based on a simple cross-sectional design that used a retrospective measure of incentives. During a single session participant rated an incentive list twice, one time concerning the time period when they began the exercise activity and the other time concerning the present time. Study 2 comprised two dates of data-collection and registered incentives among a time-period of two weeks. Study 3 broadens the time period by measuring incentives within three months and predicts the maintenance of drop-out six months after the initiation of exercise behaviour.

Study 1: Incentive enhancement of student fitness athletes and its effects on commitment to maintain

The characteristic that mainly contrasts Study 1 from the other studies is the way incentives were measured. We used a highly ecological and valid measure by conducting a pre-study in which we interviewed a sample of experts of fitness-sports about the dominant incentives in their sports. We then listed the most important incentives and let them be rated by the participants of Study 1 according to whether the incentives played an important role when they initiated the exercise activity and in the

current exercise activity. We assumed that the amount of activity-related incentives would increase more than purpose-related incentives and that activity-related incentives are better predictors of commitment to maintain. Another aim of Study 1 was to use the incentive ratings of the participants to identify prototypes of activity-related incentives and purpose-related incentives which can be used as a more economical method to measure incentives in the following studies.

Method

Participants and Procedure

26 male and 42 female athletes were recruited for a study on “Reasons for doing sports” among participants of a fitness course offered by a university sport organisation for students and alumni. Participants were between 19 and 55 years old (M = 28.29, SD = 8.74) and mostly rated themselves as advanced fitness-athletes (N = 43) or even experts in fitness sports (N = 25). Nobody classified themselves as a beginner.

Athletes who agreed to participate in the study received a take-home booklet which contained questionnaires assessing incentives of doing sports and commitment to maintain. All participants returned the booklet one week later at the next course lesson.

Incentive assessment

In order to gain activity-related incentives and purpose-related incentives for fitness sports, a short pre-study was conducted. Two male and two female fitness-instructors (M_{age} = 28.00, SD_{age} = 2.75) were explained the difference between activity-related incentives and purpose-related incentives and were asked to list incentives that were typical for fitness sports. Incentives which were listed by at least three instructors and which additionally were unambiguously classified as activity-related incentives or

purpose-related incentives by two independent raters were entered into the incentive questionnaire. The questionnaire listed 10 activity-related incentives (e.g. fun, enjoying movements) and 10 purpose-related incentives (e.g., health, gaining muscles). The incentives are listed in the first column of Table 5.

Table 5. *Activity- and purpose-related incentives and the percentage of participants who agreed with them in initiation and maintenance exercise behaviour (Study1).*

	Initiation	Maintenance
Activity–related Incentives	% Agreement	% Agreement
Having fun	61.8	85.3
Enjoying movements	36.8	61.8
Being merged in music	83.8	94.1
Being absorbed by action	39.7	55.9
Harmonious movements	29.4	58.8
Enjoying the challenge	45.6	73.5
Feeling competence	17.6	51.5
Doing everything within one’s power	29.4	60.3
Feeling as a part of a group	29.4	32.4
Feeling spurred	39.7	54.4

	Initiation	Maintenance
Purpose-related Incentives	% Agreement	% Agreement
Health	57.4	76.5
Physical Fitness	70.6	88.2
Gaining muscles	25.0	44.1
Loosing body-fat	29.4	38.2
Proud of oneself	29.4	41.2
Finding friends	16.2	13.2
As a pastime	19.1	17.6
To confirm social norms	4.40	4.40
Feeling better afterwards	50.0	82.4
Avoiding guilty conscience	10.3	13.2

These lists were administered to participants of Study 1 in two steps. First, participants were instructed to imagine the time period when they started to perform fitness-sports as vividly as possible. As soon as they managed to project their thoughts to this time period, they were asked to mark those incentives that were important reasons for them to perform fitness sports at that time. Then they were instructed to rate the same reasons for sports again, but this time with the focus on the current sport situation. They were informed that the reasons could be the same or totally different and that they should not think about the answers they gave before or even look them up on the previous page. With this procedure, activity- and purpose-related incentives could be measured at the initiation of fitness sports (retrospectively) as well as at the maintenance phase of fitness sports. Four scores (activity-related incentive/purpose-

related incentive x initiation/maintenance) were computed by simply summing up the number of marked incentives.

Because we were also interested in the enhancement of incentives, incentive enhancement indexes were computed by subtracting the number of activity-related incentives in the initiation phase from the number of activity-related incentives in the maintenance phase and did the same for purpose-related incentives. Thus, high scores mean an enhancement of activity-related incentives and purpose-related incentives, respectively.

Assessment of commitment to maintain

Commitment to maintain was measured with the four items “How committed do you feel to do fitness sports regularly?“, „How strongly do you feel yourself engaged to the training?“, „Would you be prepared to continue the training even if difficulties would appear?“, „How much pressure do you feel to go to the training?“. Participants responded to each item using a 5-point scale according to how they agree with the statement (1 not at all – 5 very much). A commitment to maintain score was created by computing the mean of the four items. The measure was reliable with an internal consistency of Cronbachs-Alpha = .80.

Results

Preliminary analyses revealed that neither age nor gender of the participants had a significant impact on the results reported below.

Descriptive Statistics and Intercorrelations of Variables

As can be seen in Table 6 activity-related incentives were related to commitment to maintain the sport-activity (initiation: $r = .30$, $p < .05$; maintenance: $r = .61$, $p < .01$),

whereas purpose-related incentives were not (initiation: r = .12, ns; maintenance: r = .20, ns). Incentives also correlated significantly among each other. Activity-related incentives at the initiation of sport behaviour were highly correlated with activity-related incentives at the maintenance of sport behaviour (r = .58, p < .01). The high correlation between the initiation and maintenance phase is also true for purpose-related incentives (r = .63, p < .01). Activity- and purpose-related incentives were less highly, but also significantly associated with each other (for initiation: r = .39, p < .01, for maintenance: r = .25, p < .05).

Table 6. *Descriptive Statistics and Two-Tailed Correlations among Variables (Study 1).*

		1	2	3	4	6	*M*	*SD*	*Alpha*
1	Activity-related incentives Initiation	1	.58***	.39**	.33**	.30*	4.13	2.49	(.73)
2	Activity-related incentives Maintenance		1	.13	.25*	.61**	6.28	2.48	(.68)
3	Purpose-related incentives Initiation			1	.63**	.12	3.12	2.08	(.66)
4	Purpose-related incentives Maintenance				1	.20	4.19	1.76	(.54)
6	Commitment to maintain					1	3.09	0.89	.80

+ p < .10. * p < .05. ** p < .01. *** p < .001.

Enhancement of Incentives

Table 6 also shows descriptively that the mean number of incentives enhanced from the initiation to the maintenance phase. In order to test whether activity-related incentives

and purpose-related incentives increased differentially, two analyses of variance with the repeated measure factor incentives at the initiation vs. incentives at the maintenance were computed separately for activity-related incentives and purpose-related incentives. Results revealed that participants reported significantly more activity-related incentives at the maintenance stage of sport activity compared to the initiation of sport-behaviour (F (1/67) = 59.92, $p < .001$). Also the number of purpose-related incentives increased significantly from the initiation to the maintenance of sport-behaviour (F (1/67) = 27.54, $p < .001$).

We also assumed that activity-related incentives should increase more than purpose-related incentives. In order to test this hypothesis the incentive enhancement indexes of activity- and purpose-related incentives were entered as the two steps of a repeated measure factor in an analysis of variance. The activity-related incentive enhancement index (M = 2.15, SD = 2.29) was significantly higher than the purpose-related incentive enhancement index (M = 1.07, SD = 1.69), F (1/67) = 12.72, p =.001), indicating a higher enhancement of activity-related incentives compared to purpose-related incentives.

Enhancement of incentives and commitment to maintain

To test whether the enhancement of activity-related incentives was more important for the prediction of commitment to maintain than the enhancement of purpose-related incentives a multiple regression analysis was conducted. To consider common variance of the activity-related incentive enhancement index and the purpose-related incentive enhancement index (Pearson correlation: r = .25, $p < .05$), both predictors were entered simultaneously into the regression analysis. The regression coefficients showed that indeed activity-related incentives were responsible for the prediction of commitment to maintain. The significant beta-weight of the activity-related incentive enhancement index

was .33 (b = .33, se_b = .12, t (67) = 2.73, p < .01), whereas the beta-weight of the purpose-related incentive enhancement index was -.01 and clearly failed significance (b = -.02, se_b = .12, t (67) = -.16, ns). The overall model was appropriate to predict commitment to maintain, R^2 = 11; F (2/67) = 3.87, p < .05.

Identification of incentive prototypes

Another aim of Study 1 was to identify a prototypical activity-related incentive and purpose-related incentive. Our simple criterion to select prototypical incentives was the percentage of participants who agreed with the incentive, namely in the initiation and in the maintenance of sport behaviour. As can be seen in Table 5, for activity-related incentives the two items with the highest agreement of participants were “being merged in music” (83.8%, 94.1%) and “having fun” (61.8%, 85.3%). Because “being merged in music” is a specific item that only fits to sports which are performed with music, the more general item “having fun” was selected. For purpose-related incentives the two best items matching the percentage criterion were “physical fitness” (70.6%, 88.2%) and “health” (57.4%, 76.6%). The item “health” was selected because it seems to be on a comparable level of abstraction as its activity-related incentive counterpart “having fun”. Furthermore, “health” is a generic term that also includes the item “physical fitness”. Thus, results of Study 1 suggested “having fun” as a prototypical activity-related incentive and “health” as a prototypical purpose-related incentive.

Brief Discussion Study 1

Having fun, *enjoying movements*, *enjoying challenges* as well as *health*, *physical fitness* and *feeling better afterwards* are examples of incentives that fitness athletes reported to vary from the initiation to the maintenance phase of sport activity. Athletes reported

more incentives at their current state of sport activity compared to the incentives they had at the initiation of exercise behaviour. In accordance to our hypothesis, the amount of activity-related incentives enhanced more than of purpose-related incentives, supporting our idea that activity-related incentives have a higher potential to be discovered through the interaction with the activity itself. We also expected that the enhancement of activity-related incentives have a higher impact on the prediction of commitment to maintain than the enhancement of purpose-related incentives. An analysis of regression in which the common variance of both incentive types was controlled confirmed the activity-related incentive enhancement, but not the purpose-related incentive enhancement as a significant predictor of commitment to maintain.

Study 1 also gained information about how to optimize the following studies concerning economy and methodology. The economical improvement concerns the measure of incentives. Although the creation of sport-specific incentive lists through interviews is a sophisticated and ecological valid method, it is also a time-consuming procedure. Therefore, we identified prototypes of an activity-related incentive (having fun) and a purpose-related incentive (health) that we will use in further studies. Both incentives were also found by other authors to be important determinants for sport activity (e.g. Gabler & Nagel, 2001; Fuchs, 1994).

The methodological improvement concerns the design of Study 1. The cross-sectional design could cause a methodological problem. Participants were asked to rate past incentives they had at the initiation and were additionally asked to rate their current incentives of exercise behaviour. Although the instructions may have buffered the tendency to compare the past with the current incentives, it could not for sure be excluded that participants compared their past incentives with their current incentives. It could therefore be argued that the participants answered in accordance with their implicit theories about how incentives may change during exercise activity. Study 2 was

designed to exclude this alternative explanation by measuring incentives of initiation and maintenance time-separated from each other and additionally by using a longitudinal design.

Study 2: Incentive enhancement of patients of a rehabilitation sport program and their effects on the maintenance of exercise behaviour

In order to demonstrate that the enhancement of the incentive measures is based on real enhancement of incentives rather than on cognitive tendencies, Study 2 measured incentives in two time-separated questionnaires, first in the last week of a health-oriented exercise course that was integrated in a rehabilitation-program and second two weeks later after participants left the rehabilitation centre.

The differences between the samples of Study 1 and 2 are obvious. Participants of Study 1 were students that did sports as a voluntary leisure activity. It could be argued that for the sample of Study 1 activity-related incentives were the major initial incentives. Simply speaking, students might have participated in a sport program because they expected it to be fun. In order to show that the effects of Study 1 could be replicated for participants that do not primarily focus on activity-related incentives, we chose a sample of participants of a health exercise program. By definition those participants exercise because they want to improve health following a medical recommendation. Improving health is a prototype of a purpose-related incentive.

Study 2 also aimed at optimizing the dependent variable. Results of the preceding study showed that the enhancement of positive activity-related incentives predicted commitment to do sports regularly in the future. Now it should be shown that the enhancement of activity-related incentives also influences real exercise activity.

Method

Participants and Procedure

47 male and 20 female participants of a health exercise program were contacted in a rehabilitation clinic and were asked to participate in a study on “Motivation and experience on exercising”. Participants with different diagnoses such as arthrosis, low back pain and fibromyalgia, aged between 24 and 79 years (*M* = 55.04, *SD* = 11.97), took part in the study. They participated in a three week health program in the clinic. For each participant physiotherapists arranged an individual exercise program consisting of different trainings like aqua-fit, Nordic walking, riding or swimming. The physiotherapists highly recommended continuing this exercise program after the discharge from the rehabilitation clinic. Participants were recruited during the last week of the program by a female experimenter who explained the procedure of data collection in detail and who directly answered questions concerning the procedure. The study consisted of two parts. First, participants received a questionnaire they filled in at the beginning of the last exercise lesson (Time 1, T1) and gave it back to the experimenter. The questionnaire included baseline-measures of incentives and asked for the exercise program that had been individually arranged for each participant. Two weeks after the end of the health exercise program (Time 2, T2) participants were contacted via mail and were asked to answer further questions about incentives and their current exercise activity.

Incentive assessment

In order to assess incentives, we used the activity-related incentive prototype “having fun” and the purpose-related incentive prototype “health”. The two incentives were administrated in the statements “I exercise, because…I have fun /…I can improve

health". Participants rated the personal importance using a 5-point scale (1: not at all – 5: very important). In order to assess the enhancement of the incentive types we subtracted the T1 ratings from the T2 ratings, separately for activity- and purpose-related incentives. A high score on the incentive enhancement measures means an increase of that type of incentive.

Assessment of exercise activity

In order to evaluate whether a participant performed the recommended exercise activity after the clinic discharge we had to qualify the exercise activity after the clinic discharge with the recommendations the physiotherapists had given. To measure the recommendations, participants were asked at T1 about the customized exercise program which the physiotherapist personally recommended to continue in the future. Details about number and kind of trainings as well as the recommended frequency of the exercise program were assessed. The number and frequency of trainings were multiplied (T1-index). Two weeks after finishing the clinic exercise program (T2) participants were simply asked about their current exercise activity. Again, number and frequency were multiplied (index T2). The incentive enhancement index was created by subtracting the T1-index from the T2-index. The participants were divided into two groups by a mediansplit. Participants who performed at least the recommended exercise program were labelled *optimal exercisers* (*N* = 42) and participants who performed less than the recommended exercise program were labelled suboptimal exercisers (*N* = 25).

Results

Preliminary analyses revealed that neither age nor gender of the participants had a significant impact on the results reported below.

Descriptive Statistics and Intercorrelations of Variables

The incentive enhancement types were not significantly associated (Pearson-correlation, r =.20, n.s.). Activity-related incentive enhancement (M = -.02, SD =.79) was significantly correlated with the variable optimal exercise vs. suboptimal exercise (Spearmans Rho, r =.31, p < .05), indicating that the higher participants' activity-related incentive enhancement was the more likely they continued their personal exercise-program. Purpose-related incentive enhancement (M = -.05, SD =.60) was not significantly associated with optimal exercise activity vs. suboptimal exercise activity (Spearmans Rho, r = -.08, n.s.).

Enhancement of Incentives

Because we assumed that incentives change differently for optimal exercisers and suboptimal exercisers, we illustrated the descriptive statistics of the two incentive-types at T1 and T2 and the enhancement indexes separately for both groups in Table 7 and illustrated the incentive change in Figure 7a and 7b. The figures show a different incentive change pattern for optimal and suboptimal exercisers. The former are characterised by an increase of activity-related incentives and a low decrease of purpose-related incentives (see Figure 7a). To test the statistical significance of the difference between activity- and purpose-related incentive changes, we compared the incentive enhancement indexes in repeated measure analyses of variance. The activity-related incentive enhancement-index (M = .19, SD = .09) was significantly higher than the purpose-related incentive enhancement-index (M = -.07, SD = .09), F (1/41) = 4.52, p < .05.

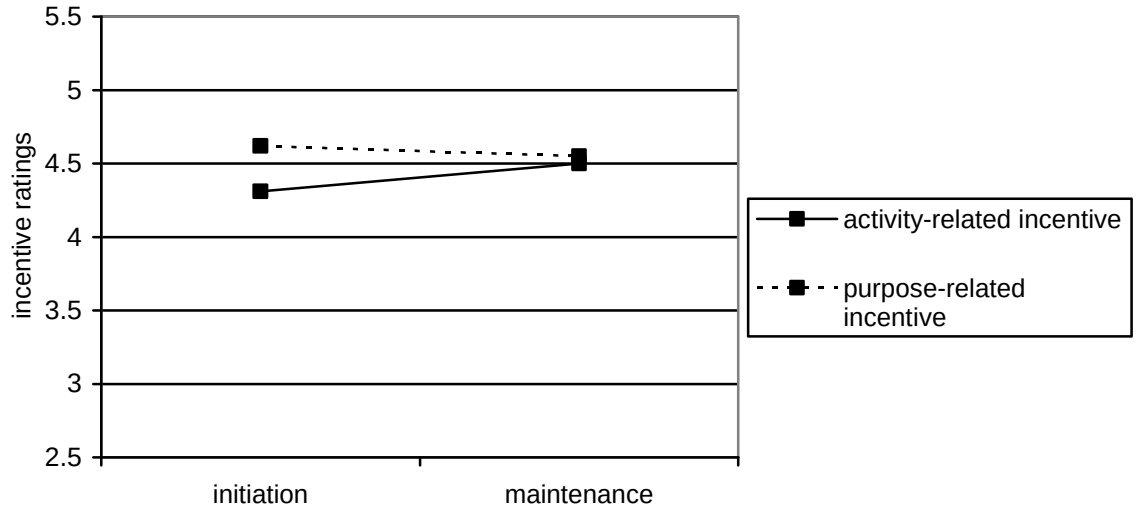
Figure 7b shows that suboptimal exercisers are characterized by a decrease of activity-related incentives and relatively stable purpose-related incentives. Repeated measure analyses of variance showed that the activity-related incentive enhancement

index (*M* = -.35, *SD* = .19) decreased significantly more than the purpose-related incentive enhancement-index (*M* = .05, *SD* = .12), *F* (1/24) = 5.21, *p* < .05.

Table 7. *Descriptive Statistics for the two incentive-types at T1, T2 and the enhancement indexes for optimal exercise activity (N=42) and suboptimal exercise activity (N=25) (Study 2).*

	T1		T2		Enhancement	
	M	*SD*	*M*	*SD*	*M*	*SD*
Optimal exercisers						
Activity-related incentives	4.31	.78	4.50	.59	.19	.09
Purpose-related incentives	4.62	.58	4.55	.63	-.07	.09
Suboptimal exercisers						
Activity-related incentives	4.28	.94	3.93	1.25	-.35	.19
Purpose-related incentives	4.67	.69	4.72	.46	.05	.12

7a) Incentive change of optimal exercisers



7b) Incentive change of suboptimal exercisers

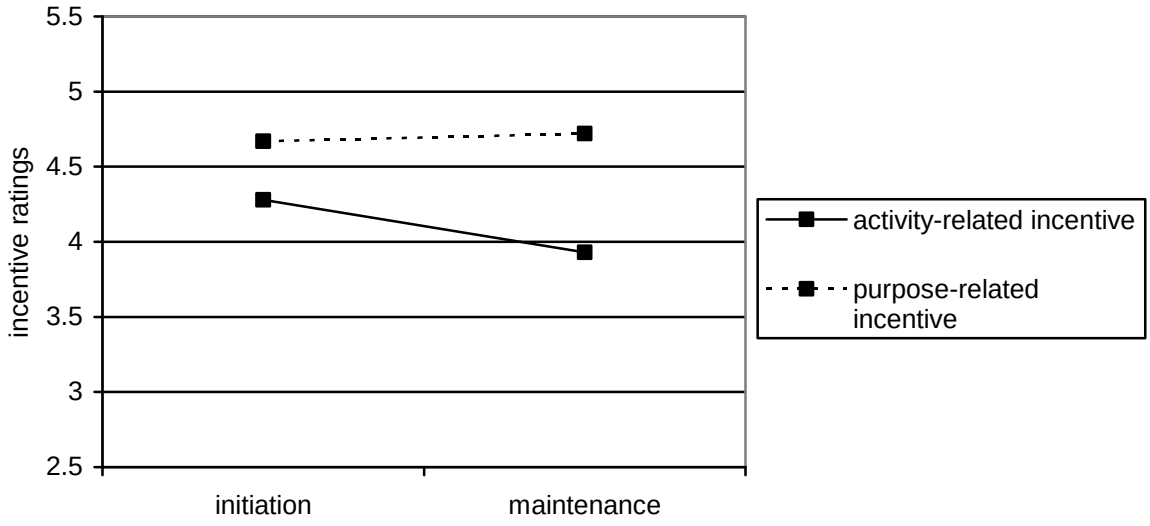


Figure 7a,b. Change of activity-related incentive and purpose-related incentive from the initiation (T1) to the maintenance (T2) of exercise activity for optimal exercisers (N = 42, see Figure 7a) and suboptimal exercisers (N = 25, see Figure 7b) (Study 2).

Enhancement of incentives and maintenance of exercise activity

The results reported above described the enhancement of incentives for optimal and suboptimal exercisers separately, but could not test causal relationships. A step-wise binary logistic regression analysis was conducted to test what type of incentive enhancement index predicts whether a participant shows an optimal exercise activity or a suboptimal exercise activity. This method predicts the probability of an event (here: being an optimal exerciser vs. being a suboptimal exerciser) by using the scores of the independent measures (here: activity- and purpose-related incentive enhancement) as predictors. We chose a forward step-wise method to enter the independent variables into the regression equation, because this gains information about the amount of influence each of the independent variables had on the dependent variable. With this procedure the constant was first entered into the regression equation. Then the independent variable with the highest correlation with the dependent variable was entered, followed by the next variable. Additionally we tested which variable could be eliminated from the regression equation due to lacking prediction power (criterion: Wald-Statistic). Put simply, the step-wise binary linear regression analysis decided which of the two incentive enhancement best predict whether a participant showed optimal or suboptimal exercise activity and which could be excluded because it did not account for additional variance. The analysis revealed that only activity-related incentive enhancement was included into the regression model (*Wald* (1) = 6.67, p <.05; B = 1.0, S_e = .39), whereas purpose-related incentive enhancement was not significant and therefore was excluded. The Chi-Square (7.95) of the model was significant (p < .01), indicating that the goodness of model fit increased significantly with positive activity-specific incentive enhancement in the equation (model 2) compared to a model that contains only the constant (model 1). Model 2 could explain 15.5% of variance of the dependent measure (Nagelkerkes' R-Square = .155) and correctly classified 71.2

percent of the participants into the groups of optimal exercisers (percentage correct: 90.2) and suboptimal exercisers (percentage correct: 40.0).

Brief discussion Study 2

Study 2 showed that our hypotheses could also be confirmed with participants of a rehabilitation exercise program. Focused on the two prototypes of incentives (*having fun* and *health*) we could once more demonstrate that incentives vary from the initiation to the maintenance phase of exercise activity. As expected, the activity-related incentive increased more than the purpose-related incentive. Additionally, participants who still performed their recommended exercise program two weeks later (optimal exerciser) showed a different incentive change pattern as participants who exercised less than recommended (suboptimal exercisers). Optimal exercisers were characterised by an increase of activity-related incentive that was higher than the increase of purpose-related incentive. Suboptimal exercisers were characterized by a decrease of activity-related incentive and relative stable purpose-related incentive. Logistic regression showed that activity-related incentive enhancement was a significant predictor of optimal vs. suboptimal exercise activity, whereas the purpose-related incentive enhancement lacked prediction power, indicating again the stronger effect of the activity-related incentive on maintenance of exercise behaviour.

Study 2 was an important extension to the first study, because it assessed the real exercise behaviour rather than just the commitment to maintain exercising. But, due to the fact that the time of data collection comprised just two weeks, the study still leaves the question about the role of incentives for the long-term maintenance of behaviour unanswered.

Study 3: Incentive enhancement of Nordic Walkers and its effects on the maintenance of sport-behaviour

One added value of Study 3 to the preceding studies is its longitudinal design. To prove that the incentive enhancement predicts the long-term maintenance of sport activity, the behaviour measure must fulfil a time-criterion for behaviour *maintenance*. One criterion is based on the Transtheoretical Model (TTM) by Prochaska and DiClemente (1983, 1992). The authors postulated that the different stages which individuals go through when they change health-related behaviour (see above) can be defined by time-criteria. These criteria are based on the analyses of the behaviour change processes of individuals trying to quit smoking (e.g., DiClemente & Prochaska, 1982) and were also proven for other health-related behaviour (e.g. Prochaska, 1994). According to the TTM, the maintenance stage begins when an individual maintains the behaviour change for six months. To fulfil this time-criterion, Study 3 accompanied beginners of Nordic Walking from their very first Nordic Walking lesson (beginning of the action stage) up to their Nordic Walking activity after six months (maintenance stage).

Another important added value of Study 3 is the consideration of negative incentives. Referring to theoretical assumptions that behaviour is determined by positive incentives which enhance the probability of behaviour and negative incentives which decrease the probability of behaviour (e.g., Vroom, 1964) we assessed prototypes of positive incentives like in Study 2 and additionally measured negative incentives. As in Study 1 and Study 2, we hypothesized that positive activity-related incentives should enhance the activity more than positive purpose-related incentives from the initiation to the maintenance phase. We again expected the enhancement of positive activity-related incentives as a better predictor of maintenance vs. drop-out than the enhancement of positive purpose-related incentives. Parallel to the assumption

regarding positive incentives, we assumed for negative incentives that the activity-related incentives should enhance activity more than the purpose-related incentives. This is due to the fact that the interaction with an activity not only reveals positive incentives but also negative incentives. Concerning the prediction of maintenance vs. drop-out, the line of argumentation is also parallel to that of positive incentives. According to the principle of classic conditioning (Skinner, 1938), negative activity-related incentives (e.g., boredom) should work as immediate punishments of the performed exercise activity and thus should reduce the probability that the activity is performed again. Negative purpose-related incentives (e.g., money or time costs) are less time-associated to the exercise behaviour and thus should reduce the probability of future exercise behaviour to a lower amount than negative activity-related incentives.

Study 3 also differed from Study 1 and Study 2 in the nature of the sample. Participants of Study 1 were young students for whom activity-related incentives might have been important initial incentives. The sample of Study 2 consisted of elderly patients who had an important initial focus on health-related incentives. What was still missing is a sample for which activity- and purpose-related incentives are equally important. Therefore, Study 3 used a sample of middle-aged Nordic Walkers who did sports as a leisure-activity. Thus, activity-related incentives can be assumed. In addition, because of its well-known health-effects, Nordic Walking is also characterized by the purpose-related incentive of health.

Method

Participants and Procedure

68 participants with a mean age of 44.41 (*SD* = 8.60, range from 29-65 years) were recruited from local Nordic Walking courses to take part in a study about “First

experiences in Nordic Walking". Most of them were female (*N* = 60). The Nordic Walking courses were associated to a local Nordic Walking Association that offered the courses explicitly to beginners with no prior knowledge of Nordic Walking. The Nordic Walking fitness instructors confirmed that all participants were correctly classified as beginners.

Participants were recruited in the very first lesson by a female experimenter who explained the procedure of data collection in detail and who answered questions concerning the procedure directly. The experimenter informed that data were collected in three phases in order to get a realistic rating of experiences in the first Nordic Walking course. Participants who decided to take part in the study received a first take-home booklet. Participants were asked to fill in this booklet just after they came back home from the first sports lesson (Time 1, T1) and sent it back immediately via mail. Out of 72 athletes who indicated their interest to participate in the study, 68 participants sent the questionnaire back within one week. The questionnaire included the baseline-measures of incentives and informed the participants that the next data collection would be at the end of the course. At the end of the Nordic Walking course three months after the start (12 weekly lessons; Time 2, T2), participants again filled in a questionnaire about their incentives of Nordic Walking. Additionally, the fitness-instructors informed the participants about further Nordic Walking opportunities the participants can take part in the future (e.g., Nordic Walking routes; further courses) and that they will be contacted by the experimenter three months later for another questionnaire about their further Nordic Walking activities. Six months after beginning the course, participants were contacted via mail and were asked for their current Nordic Walking activities (Time 3, T3). After having sent back the last questionnaire participants were debriefed about the research question and the hypotheses.

Incentive assessment

In order to assess incentives the activity-related incentive prototype “having fun” and the purpose-related incentive prototype “health” were used. Because Study 3 aimed at additionally assessing negative incentives, two negative incentives were added that had been proven to be frequently listed incentives in other studies (e.g., Fuchs, 1994). The negative activity-related incentive was “negative sensations during sports“ and the negative purpose-related incentive was “costs (time, money)“. The four incentives were administered in the statements “I do Nordic Walking, because … I have fun (activity-related incentive) / … It is good for my health” (purpose-related incentive). The negative incentives were introduced with “I don’t do Nordic Walking, because … I have negative sensations during sports (activity-related incentive) / … “It brings about costs (financial, time) (purpose-related incentive)”. Participants rated their agreement to how the statements fit to them personally using a 5-point scale (1: not at all – 5: very much). For each of the four incentive types (activity- vs. purpose-related incentives x positive vs. negative incentives), the incentive enhancement was measured by subtracting the T1 ratings from the T2 ratings. Thus, high scores mean a high increase of that type of incentive.

Assessment of drop-out vs. maintenance

Maintenance and drop-out of Nordic Walking was measured by simply asking participants after six months (T3) whether they still perform Nordic Walking sports or whether they dropped out. 49 of 68 participants (72.1%) indicated to still do Nordic Walking regularly (at least once a week) and 19 participants indicated to have quitted the Nordic Walking sports.

Results

Preliminary analyses showed that women and men did not differ in any of the variables that were registered. Also age of participants had no significant impact on the results reported below.

Descriptive Statistics and Intercorrelations of Variables

Table 8 shows descriptive statistics and correlations among all four incentive enhancements and maintenance vs. drop-out. The two positive incentive enhancements were significantly associated ($r = .42$, $p < .01$) as well as both negative incentive enhancement ($r = .43$, $p < .01$). Spearmans' Rho correlations were used to illustrate the association between the incentive enhancement types and the dichotomous variable maintenance vs. drop-out. Positive activity-related incentives as well as positive purpose-related incentives were significantly related to the maintenance vs. drop-out-variable, indicating that the higher participants' positive incentives enhancement were the less likely they dropped-out of the Nordic Walking sports.

Table 8. *Descriptive Statistics and associations (Pearson correlation or Spearmans Rho) among incentive enhancement and maintenance vs. drop-out (Study 3, N = 68).*

		1	2	3	4	5	*M*	*SD*
1	Positive activity-related incentive enhancement	1	-.09	.42**	-.21	-.59**	-.15	.65
2	Negative activity-related incentive enhancement		1	-.13	.43**	.05	-.23	1.1
3	Positive purpose-related incentive enhancement			1	-.16	-.36**	-.23	.69
4	Negative purpose-related incentive enhancement				1	.25	-.16	1.3
5	Maintenance vs.Drop-Out at T3+					1	-	-

+ because maintenance (coded 1) vs. drop-out (coded 2) is a dichotomous variable, Spearmans' Rho was computed.

Enhancement of incentives for maintainers and drop-outs

Because we assumed different incentive changes for maintainers and drop-outs, we illustrated the descriptive statistics for the four incentive-types at T1 and T2 and the enhancement indexes separately for both groups in Table 9 and illustrated the positive incentive changes in Figure 8a and 8b and the negative incentive change in Figure 9a and 9b.

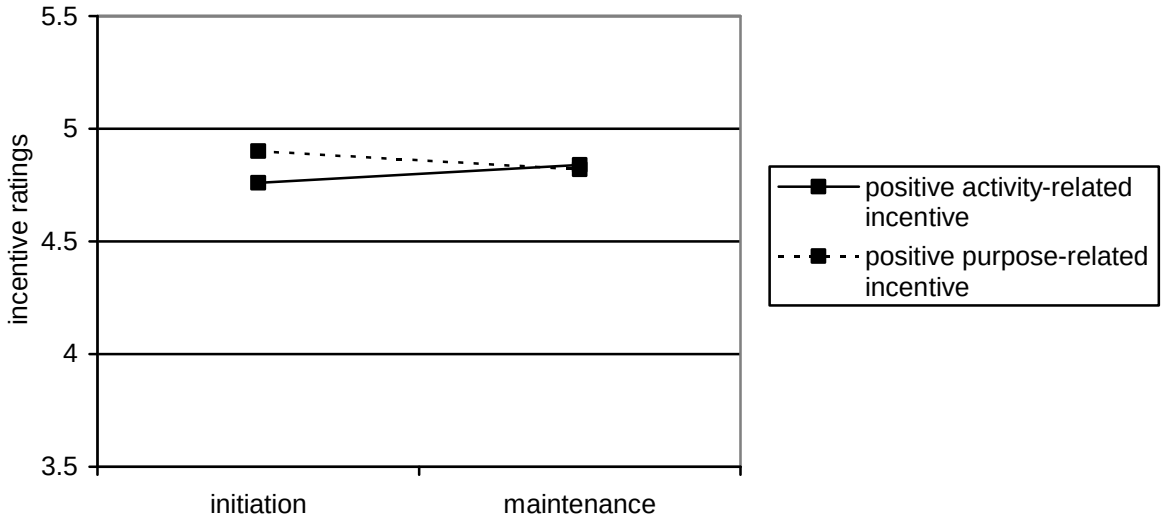
Table 9. *Descriptive Statistics of the four incentive-types at T1, T2 and the enhancement indexes for participants who maintained the Nordic Walking course (N=49) and those who dropped out (N=19) (Study 3).*

	T1		T2		Enhancement	
	M	*SD*	*M*	*SD*	*M*	*SD*
Maintainers						
Positive activity-related incentives	4.76	.56	4.84	.37	.08	.45
Negative activity-related incentives	1.80	1.08	1.53	.89	-.26	1.11
Positive purpose-related incentives	4.90	.31	4.82	.44	-.08	.53
Negative purpose-related incentives	2.10	1.28	1.71	1.06	-.39	.25
Drop-Outs						
Positive activity-related incentives	4.68	.48	3.95	.85	-.74	.73
Negative activity-related incentives	1.95	1.08	1.79	.92	-.16	1.12
Positive purpose-related incentives	4.79	.42	4.16	.96	-.63	.90
Negative purpose-related incentives	1.84	1.01	2.26	1.95	.42	1.17

The maintainers (see figure 8a) are characterized by an increase of positive activity-related incentives and stable positive purpose-related incentives. To test the

statistical significance of the differences between positive activity- and purpose-related incentive enhancements, we compared the incentive enhancement indexes in repeated measure analyses of variance. The positive activity-related incentive enhancement index (*M* = .08, *SD* = .45) was higher than the positive purpose-related incentive enhancement index (*M*=-.08, *SD* = .53). The effect was marginally significant, *F* (1/48) = 3.35, *p* =.07, indicating again a difference in the enhancement of positive activity- compared to purpose-related incentives. Figure 8b shows that drop-outs were mainly characterized by a decrease of positive activity-related incentives and a similar decrease of positive purpose-related incentives. The enhancement indexes of positive activity-related incentives (*M* = -.74, *SD* = .73) and of positive purpose-related incentives (*M* = -.63, *SD* = .90) did not differ significantly (*F* (1/18) = .20, *p* = .63).

8a) positive incentive change of maintainers



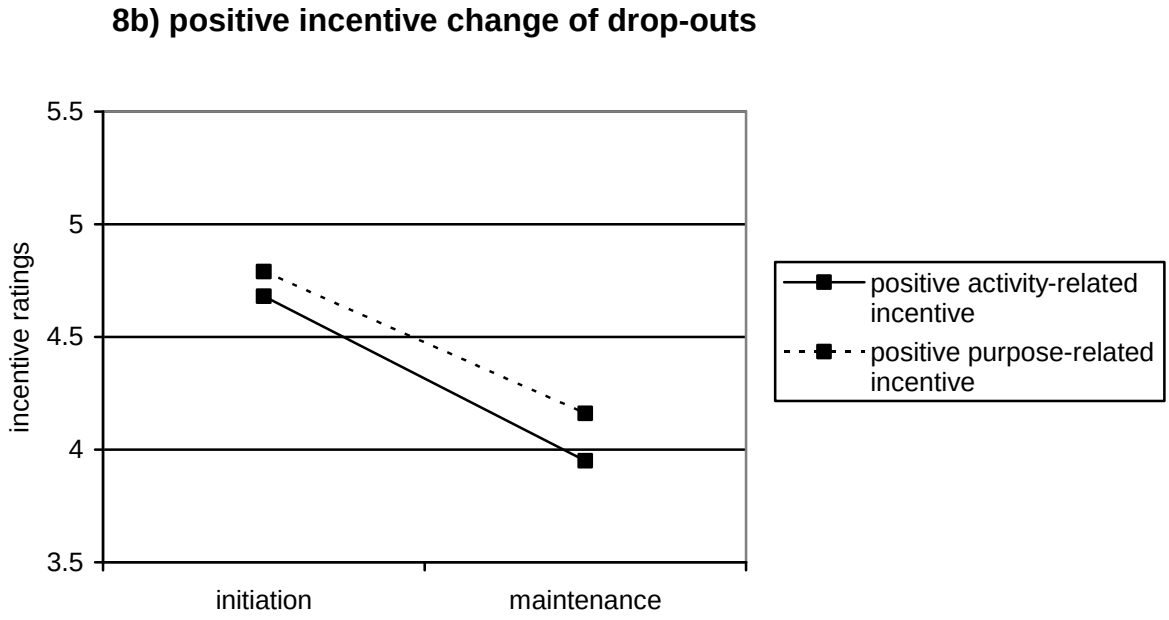
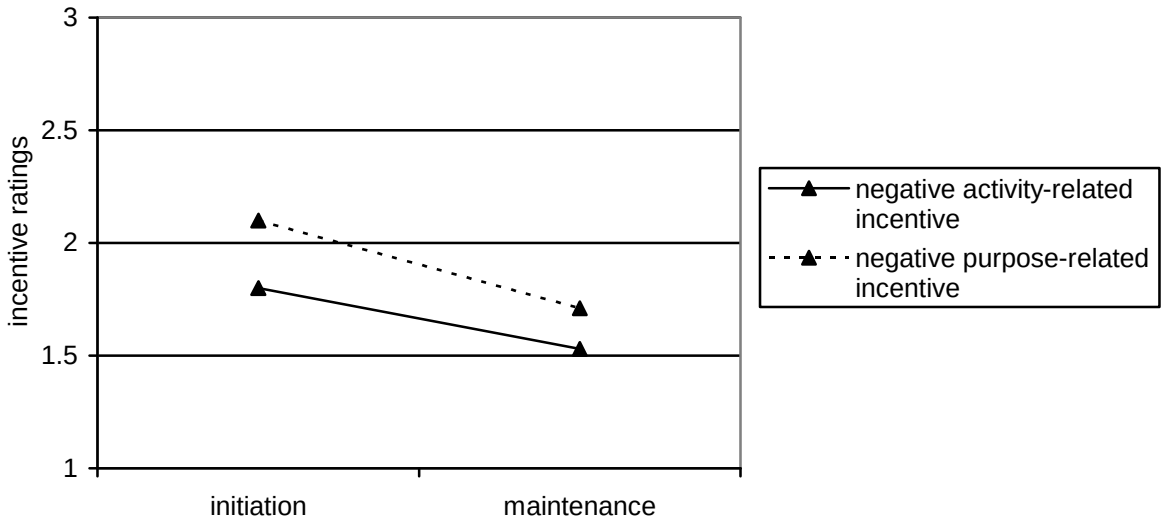


Figure 8a,b. Change of positive activity-related incentive and purpose-related incentive from the initiation (T1) to the maintenance (T3) of exercise activity for maintainers (N = 49, see Figure 8a) and drop-outs (N = 19, see Figure 8b) (Study 3).

Figure 9a and 9b illustrate the change of negative incentives. For maintainers, both types of negative incentives decreased similarly from T1 to T3. No differences between the enhancement indexes were found, F (1/48) = .52, *ns*. For drop-outs the negative incentives increased, whereby negative purpose-related incentives increased more than negative activity-related incentives. Repeated measure analyses of variance revealed that the negative purpose-related incentive enhancement index (M = .42, SD = 1.17) was marginally higher than the negative activity-related incentive enhancement index (M = -.16, SD = 1.12), F (1/18) = 3.13, p =.09.

9a) negative incentive change of maintainers



9b) negative incentive change of drop-outs

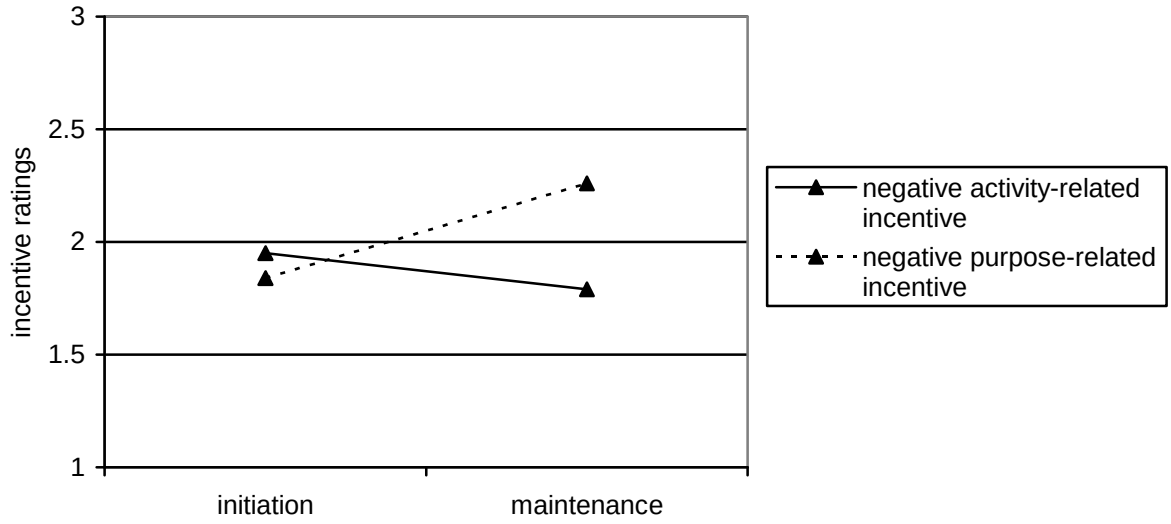


Figure 9a,b. Change of negative activity-related incentive and purpose-related incentive from the initiation (T1) to the maintenance (T3) of exercise activity for maintainers (N = 49, see Figure 9a) and drop-outs (N = 19, see Figure 9b) (Study 3).

Enhancement of incentives and maintenance of exercise behaviour vs. drop-out

A step-wise binary logistic regression analysis tested what types of incentive enhancement predict whether an athlete maintained or dropped out six months after the initiation of the exercise activity. This time, we defined four incentive enhancement (activity- vs. purpose-related incentives x positive vs. negative incentive) as predictors and the maintenance or drop-out after six months as the criterion. The analysis revealed that only the positive activity-related incentive enhancement was included into the regression model (*Wald* (1) = 13.62, $p < .001$; $B = -3.12$, $S_e = .84$), whereas the other incentive enhancement types were not significant and were excluded due to lacking predictional power. The Chi-Square of 26.45 the model was highly significant ($p < .001$), indicating that the goodness of model fit increased significantly with positive activity-related incentive enhancement in the equation (model 2) compared to a model that contained only the constant (model 1). Model 2 could explain 46.4% of variance of the dependent measure (Nagelkerkes' *R*-Square = .464) and correctly classified 85.3 percent of participants into the groups of maintainers (percentage correct: 95.5) and drop-outs (percentage correct: 58.0).

Brief Discussion Study 3

The present study accompanied Nordic Walkers from the initiation stage up to the maintenance stage of exercise activity. This allowed measuring incentives at exactly the time they occurred. The time-period of six months allowed testing the effects of incentive enhancement on the long-term maintenance of exercise behaviour. The results revealed that participants who maintained the Nordic Walking sports and those who dropped out after six months showed a different incentive enhancement pattern. Maintainers showed an increase of positive incentives and a decrease of negative

incentives. As expected, positive activity-related incentives increased significantly more than positive purpose-related incentives. This supports our assumption that positive activity-related incentives are inherent in the exercise activity and thereby must be detected in the interaction with the activity. The negative incentive types did not differ. Drop-outs were characterized by a converse enhancement pattern that is a decrease of positive incentives and an increase of negative incentives. Unexpectedly, negative purpose-related incentives increased more than negative activity-related incentives. One possible explanation for the unexpected finding could lie in the assessment of negative activity-related incentives. By asking participants to rate their negative physical sensations they maybe thought of sweating and feeling exhausted and thus we may accidentally have assessed physiological processes that decreased due to physical habituation processes. In contrast, the negative purpose-related incentive “costs (time, money)” became more important with the experience of time costs and financial costs (e.g., professional Nordic Walking equipment).

A binary logistic regression analysis with all four types of incentive enhancement (activity- vs. purpose-related incentives x positive vs. negative incentives) confirmed parts of our second hypothesis: The positive activity-related incentive enhancement was included into the regression equation as a significant predictor of maintenance vs. drop-out, whereas the purpose-related incentives were excluded from the regression equation due to lacking predictional power. In contrast to our hypothesis, but in accordance with the explanation of the missing enhancement of negative activity-related incentives reported above, the negative activity-related incentive enhancement was not included in the regression equation and thus did not reveal as an important predictor.

General Discussion

Present research leads to the conclusion that incentives of behaviour are not static. Instead they are dynamic, which must be considered to predict complex human behaviour. The idea of dynamic changes corresponds on the one hand to modern theories of behaviour change which postulate that the course of complex human action consists of qualitatively different action phases in which different variables are active (see Norman, Abraham & Conner, 2000; Prochaska & DiClemente, 1983; Rothman, 2000; Schwarzer, 1992). On the other hand it also corresponds to theoretical approaches considering that individuals make psychological and physiological experiences of both, positive nature (e.g., experiencing positive incentives, being satisfied) and negative nature (e.g., experiencing negative incentives, being disappointed) while performing an activity that again determines their future behaviour (Leventhal & Cameron, 1987; Rothman, 2000).

In our research we did not assume all incentives to be equally dynamic and thus we first had to differentiate between activity- and purpose-related incentives (Rheinberg, 1989). We postulated different enhancement effects of these two types of incentives. Activity-related incentives were predicted to increase more than purpose-related incentives. The former are inherent in the activity (Woodworth, 1918) and are discovered through the interaction with the activity (Csikszentmihalyi & Rathunde, 1992), whereas the latter are more obvious from the beginning. Three studies with young fitness-athletes, rehabilitation patients and middle-aged Nordic Walkers empirically confirmed our hypothesis concerning positive incentives. In all studies the positive activity-related incentives increased more from the initiation to the maintenance phase of exercise behaviour than the positive purpose-related incentives. Optimal exercisers (Study 2) and maintainers (Study 3) were characterized by an enhancement

of positive activity- but not positive purpose-related incentives, which underlined impressively the postulated strong effect of activity-related incentives in exercise behaviour. It is noteworthy that the consistent pattern of result revealed that, albeit with totally different samples, different measures of incentives and different study-designs were used. This methodological convergence underlines the robustness of the effects we found.

Comparing the incentive enhancement of optimal-exercisers vs. suboptimal-exercisers (Study 2) and drop-outs vs. maintainers (Study 3), respectively, supports our hypothesis for the former groups, but also revealed unexpected results for the latter groups. In accordance with our hypothesis, optimal-exercisers and maintainers were characterized by a stronger enhancement of positive activity- compared to positive purpose-related incentives. Unexpectedly, drop-outs were characterized by a higher enhancement of negative purpose-related incentives than negative activity-related incentives. For the drop-outs we expected just the opposite, because negative activity-related incentives were assumed to have a higher potential to emerge while exercising than the negative purpose-related incentives. The diametrically opposite results challenged us to rethink our assumption. We had asked participants to rate their negative physical sensations during exercising. For them, feeling exhausted or feeling tired might have been such negative physical sensations which typically decrease rather than increase with the duration of exercise activity. This can be explained by physiological habituation processes and enhancement of competences. Further studies must revise the measure of negative activity-related incentives by asking for "psychological" incentives as feeling discomfort, feeling bored, disliking the activity or feelings of aversion rather than for physiological incentives. Those psychological incentives are more likely to be discovered while performing an activity over a certain amount of time and thus should have a high potential to evolve from the initiation to the

maintenance phase of behaviour. We assume that our hypotheses of the stronger enhancement of negative activity-related incentives and their higher predictive power for the drop-out would be confirmed if psychological incentives were measured. In contrast to the measure of negative activity-related incentives, the measurement of purpose-related incentives in present research seems to have succeeded because the results replicated previous research showing that participants disengage from sport-participation due to costs like money, time or way to the training (see Lee & Owen, 1985; Coakley & White, 1992).

Another aim of the present research was to predict exercise behaviour by using incentives as predictors. According to the regularities of classical conditioning, activity-related incentives are closer time-associated with the activity than purpose-related incentives and thus were assumed to have a stronger rewarding effect on the maintenance of behaviour than purpose-related incentives. In the case of positive incentives the hypothesis was totally confirmed. In Study 1 activity- but not purpose-related incentives predicted commitment to maintain and in Study 2 and Study 3 positive activity-related incentives revealed to be important to predict optimal-exercising vs. suboptimal-exercising (Study 2) and maintenance vs. drop-out (Study 3) whereas positive purpose-related incentives failed to account for a significant amount of variance. The results concerning negative incentives however contradict the hypothesis. Negative activity-related incentives contributed significantly to the differentiation between optimal-exercisers vs. suboptimal-exercisers and maintainers vs. drop-outs. We have already criticized our negative activity-related incentive measure and assume that the same criticism is valid for the present unexpected result.

The present research contributes to research on incentives in at least three aspects. First, results showed, that the effect of incentives is not limited to the intention to perform an activity as has been hypothesized by traditional models of motivation

(e.g., Heckhausen & Gollwitzer, 1987), but is extended also to the action and maintenance phase of behaviour. Second, present research demonstrated that positive activity- and purpose-related incentives must by all means be considered separately due to their different nature. Third, positive activity-related incentives have a higher potential to enhance over time and additionally have a higher activity-rewarding power than purpose-related incentives. In this sense incentives are dynamic.

The results of present research also allow drawing conclusions for practical interventions. For example, according to our results, health campaigns that aim at motivating individuals to adopt exercise behaviour should be less effective when advertising with activity-related incentives as for example having fun. For most exercise beginners it is not fun from the beginning. Instead, fun and other positive qualities of experience typically emerge later after the activity has been performed for a certain amount of time. Promising fun from the beginning could frustrate individuals and may facilitate the drop-out because of unsatisfied expectancies (Rothman, 2000). Instead, beginners need a realistic preview of the exercise behaviour and once started exercising they need good conditions to discover activity-related incentives while performing the exercise activity. More research is needed to figure out the conditions that facilitates the development of activity-related incentives.

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Curriculum Vitae

Education

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Since 2005	University of Berne, Master of advanced studies in psychotherapy
1999 – 2004	University of Berne, Department of Psychology, licentiate (lic. phil.) in Clinical Psychology, Psychotherapy, and Neuropsychology

Employment History

Since 2005	Third party funds doctoral candidate at the Department of Psychology, Psychology of Motivation, Volition, and Emotion, University of Zurich
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